This proposal is a Tier II component of a package of multimodal transportation improvements within the Santa Ana Transportation Corridor (SATC), Orange County, California. A Notice of Intent on the SATC study was published in the **Federal Register** on April 29, 1982. An extensive scoping process was undertaken at that time.

Alternatives being considered for the freeway widening project are:

1. Widen by two lanes using minimum design standards.

2. Widen by two lanes plus two auxiliary lanes using high design standards.

3. Widen by two lanes which would be reserved for high occupancy vehicles.

4. No Project: a "no build" option.

Caltrans has conducted an environmental scoping meeting to solicit input from Federal, State, and local agencies to identify significant environmental issues to be considered in the FIS. As the DFIS is being prepared, Caltrans will conduct public meetings to inform the public of the status of the project.

To ensure that the full range of issues relating to these proposed alternatives are addressed and incorporated into the planning process, your comments are being solicited. Comments and questions concerning this proposed action and the FIS should be directed to the FHWA at the address provided above.

Issued on: July 12, 1984.

D.L. Eyres,

Acting District Engineer, Sacramento, California.

[FR Doc. 84-19318 Filed 7-20-84; 8:45 am]

BILLING CODE 4910-22-M

Environmental Impact Statement; Orange County, CA

AGENCY: Federal Highway Administration (FHWA), DOT.

ACTION: Notice of Intent.

SUMMARY: The FHWA is issuing this notice to advise the public that an Environmental Impact Statement will be prepared for a proposed highway project in Orange County, California.

FOR FURTHER INFORMATION CONTACT: Glenn Clinton, District Engineer, Federal Highway Administration, P.O. Box 1915, Sacramento, California 95809, Telephone: (916) 440-2804.

SUPPLEMENTARY INFORMATION: The FHWA, in cooperation with the California Department of Transportation (CALTRANS) and Orange County Environmental Management Agency (OCEMA) will prepare an Environmental Impact Statement (EIS) on a proposal to locate and construct a new high-speed, high capacity, limited access transportation facility. Transportation improvements are needed to serve existing and planned development. This facility (tentatively identified as State Route 73) will begin as an extension of the existing Corona del Mar Freeway (State Route 73) near MacArthur Boulevard (on the boundary between the Cities of Newport Beach and Irvine) and extend southeasterly to join the San Diego Freeway (I-5) between Avery Parkway and Junipero Serra Road near the northerly limit of the City of San Juan Capistrano. Alternatives being considered for the project are:

A. New Highway Alternative

This involves locating and constructing between six to ten general traffic lanes. An estimated 12 proposed interchanges may be included in this alternative. Also included are passing lanes at various locations where the grade approaches 6%, and auxiliary lanes to improve interchange function.

B. Transit/HOV Improvements

In addition to the above, transit/high occupancy vehicle (HOV) lanes, located in the median, will be evaluated, along with Park-and-Ride Facilities at five locations.

C. No Project

This alternative is essentially the "no build" option.

Note.—All other reasonable alternatives including other corridors and possibly various transit options will be considered. UMTA's participation is invited.

Consultation by Orange County with various state and local agencies began in August of 1977. These consultations identified areas of special concern along the proposed route, which were the focus of locally initiated environmental studies. FHWA believes that this early consultation has been extensive and consistent with 40 CFR 1501.7. However, in order to inform potentially affected agencies and the public of FHWA involvement, two Federal scoping meetings will be held in the study corridor in the summer 1984. Once dates and locations are established, appropriate notification will be given.

To ensure that the full range of issues related to this proposed route are addressed and all significant issues identified, comments and suggestions are invited from all interested parties. Comments and questions concerning this proposed action and the EIS should be directed to the FHWA at the address provided above.

Issued on: July 12, 1984.

Glenn Clinton,

District Engineer, Sacramento, California.

[FR Doc. 84-19237 Filed 7-20-84; 8:45 am]

BILLING CODE 4910-22-M

Sunshine Act Meetings

Federal Register
Vol. 49, No. 142
Monday, July 23, 1984

This section of the FEDERAL REGISTER contains notices of meetings published under the "Government in the Sunshine Act" (Pub. L. 94-409) 5 U.S.C. 552b(e)(3).

CONTENTS

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FEDERAL HOME LOAN BANK BOARD

"FEDERAL REGISTER" CITATION OF PREVIOUS ANNOUNCEMENT: Vol. No. 49, Page No. 28504, Date Published: Thursday, July 12, 1984.

PLACE: Board Room, 6th Floor, 1700 G Street, NW., Washington DC.

STATUS: Open meeting.

CONTACT PERSON FOR MORE INFORMATION: Ms. Gravlee, (202-377-6970).

CHANGES IN THE MEETING: The Bank Board meeting previously scheduled for Thursday, July 19, 1984, at 2:30 p.m., has been cancelled.

No. 91, July 19, 1984.

J.J. Finn,

Secretary.

[FR Doc. 84-19492 Filed 7-19-84; 3:54 pm]

BILLING CODE 6720-01-M

2

HARRY S TRUMAN SCHOLARSHIP FOUNDATION

TIME AND DATE: 2:00 p.m., Friday, September 7, 1984.

PLACE: Board Room, 712 Jackson Place, NW., Washington, D.C. 20006.

STATUS: The meeting will be open to the public.

MATTERS TO BE CONSIDERED: Portions open to the public:

1. Call meeting to order. Check quorum.
2. Adoption of proposed agenda.
3. Approval of minutes of April 9, 1984 meeting.
4. Election of Chairman.
5. Report of Chairman.
6. Report of Executive Secretary.
7. Report of General Counsel.
8. New Business.
9. Set date for next meeting in April, 1985.

CONTACT PERSON FOR MORE INFORMATION: Malcolm C. McCormack, Executive Secretary, telephone: 202/395-4831.

Malcolm C. McCormack,

Executive Secretary.

[FR Doc. 84-19437 Filed 7-19-84; 11:37 am]

BILLING CODE 9500-01-M

3

NATIONAL TRANSPORTATION SAFETY BOARD

[NM-84-25]

"FEDERAL REGISTER" CITATION OF PREVIOUS ANNOUNCEMENT: 49 FR 28504, July 12, 1984.

PREVIOUSLY ANNOUNCED TIME AND DATE OF MEETING: 9 a.m., Thursday, July 12, 1984.

CHANGE IN MEETING: A majority of the Board determined by recorded vote that the business of the Board required revising the agenda of this meeting and that no earlier announcement was possible. The following items were deleted from the agenda:

4. *Opinion and Order:* Administrator v. Zock, Dkt. SE-5777; disposition of Administrator's appeal.
5. *Opinion and Order:* Petition of Eckes, Dkt. SM-3145; disposition of the Administrator's appeal.

The following items were added to the agenda:

4. *Opinion and Order:* Petition of Billings, Dkt. SM-3043; disposition of the Administrator's appeal.
5. *Opinion and Order:* Administrator v. Bracker, Dkt. SE-6004; disposition of the Administrator's appeal.

CONTACT PERSON FOR MORE INFORMATION: Sharon Flemming, (202) 382-6525.

H. Ray Smith, Jr.,

Federal Register Liaison Officer.

July 19, 1984.

[FR Doc. 84-19475 Filed 7-19-84; 1:32 pm]

BILLING CODE 7533-01-M

4

NATIONAL TRANSPORTATION SAFETY BOARD

[NM-84-26]

"FEDERAL REGISTER" CITATION OF PREVIOUS ANNOUNCEMENT: 49 FR 29190, July 18, 1984.

PREVIOUSLY ANNOUNCED TIME AND DATE OF MEETING: 9 a.m., Tuesday, July 24, 1984.

CHANGE IN MEETING: A majority of the Board determined by recorded vote that the business of the Board required revising the agenda of this meeting and that no earlier announcement was possible. The following item was added to the agenda.

3. *Recommendations* to the Federal Aviation Administration regarding the design, placement, and inspection of runway and taxiway signs, and training in crew coordination in ground operations.

CONTACT PERSON FOR MORE INFORMATION: Sharon Flemming, (202) 382-6525.

H. Ray Smith, Jr.,

Federal Register Liason Officer, July 19, 1984.

[FR Doc. 84-19474 Filed 7-19-84; 1:32 a.m.]

BILLING CODE 7533-01-M

federal register

Monday
July 23, 1984

Part II

Environmental Protection Agency

40 CFR Part 60

Standards of Performance for New Stationary Sources, Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) Constructed After July 23, 1984; Proposed Rule and Notice of Public Hearing

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL-2401-4]

Standards of Performance for New Stationary Sources, Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) Constructed After July 23, 1984

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule and notice of public hearing.

SUMMARY: The proposed standards would limit emissions of volatile organic compounds (VOC) from new, modified, and reconstructed storage vessels storing volatile organic liquids (VOL). The proposed standards implement section III of the Clean Air Act and are based on the Administrator's determination that emissions from the synthetic organic chemical manufacturing industry and volatile organic liquid storage vessels cause, or contribute significantly to, air pollution that may reasonably be anticipated to endanger public health or welfare. The intent is to require new, modified, and reconstructed VOL storage vessels to control emissions to the level achievable by the best demonstrated system of continuous emission reduction, considering costs, nonair quality health, and environmental and energy impacts.

The facilities covered by the these proposed standards include new petroleum liquid storage vessels of the types for which new source performance standards have already been promulgated. These proposed standards revise the requirements for petroleum liquid storage vessels.

This **Federal Register** notice also includes a revision to the EPA priority list (44 FR 49222, August 17, 1979) expanding the synthetic organic chemical manufacturing industry (SOCMI) category to include VOL storage vessels and handling equipment that are not located at SOCMI plants and also amends the reporting and recordkeeping requirements for petroleum liquid storage vessels covered under 40 CFR Part 60 Subpart Ka.

A public hearing will be held, if requested, to provide interested persons an opportunity for oral presentations of data, views, or arguments concerning the proposed standards.

DATE: *Comments.* Comments must be received on or before October 2, 1984.

Public Hearing. A public hearing, if requested by August 14, 1984, will be held on September 11, 1984, beginning at 10:00 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony must contact the EPA by August 14, 1984.

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-80-51, U.S. Environmental Protection Agency, 401 M Street SW, Washington, D.C. 20460.

Public Hearing. The public hearing, if requested, will be held at ERC Auditorium, Corner of Hwy 54 & Alexander Drive, Research Triangle Park, North Carolina. Persons wishing to present oral testimony should notify Ms. Shelby Journigan, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, NC 27711, telephone number (919) 541-5578.

Background Information Document. The background information document (BID) for the proposed standards may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to "Volatile Organic Compound Emissions from Volatile Organic Liquid Storage Vessels—Background Information for Proposed Standards," EPA-450/3-81-003a.

Docket. Docket No. A-80-51, containing supporting information used in developing the proposed standards, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, SW, Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: For further information regarding the rationale for the regulatory aspects of the standards or the requirements of the standards, contact Mr. C. Douglas Bell, Standards Development Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5578. For further information regarding the technical aspects of the source category or control technologies, contact Mr. James Durham, Chemicals and Petroleum Branch, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5671.

SUPPLEMENTARY INFORMATION:

Proposed Standards

The proposed standard would apply to each new, modified, or reconstructed storage vessel, regardless of location, with a capacity greater than or equal to 40 cubic meter (m^3) ≅10,000 gallons) storing a volatile organic liquid from which VOC's can be emitted to the atmosphere. The applicability of the proposed standards includes storage vessels containing petroleum liquids.

Standards of performance for new source established under section 111 of the Clean Air reflect:

> . . . application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated. [Section 111(a)(1)].

For convenience, this will be referred to as "best demonstrated technology" or "BDT."

The proposed standard would require that each new, modified, or reconstructed storage vessel, regardless of location, with either a capacity greater than or equal to 151 m^3, storing a VOL with a maximum true vapor pressure greater than or equal to 3.5 kPa (≅0.51 psia) but less than 76.6 kPa ((≅11.1 psia) or with a capacity greater than or equal to 75 m^3, but less than 151 m^3, storing a VOL with a maximum true vapor pressure greater than or equal to 27.6 kPa (4.0 psia) but less than 76.6 kPa (11.1 psia) be equipped with:

1. A fixed roof in conjunction with an internal floating roof equipped with a liquid-mounted primary seal, flexible fabric sleeve seals on pipe columns (if any), slit fabric membranes on sample wells, and gasketed covers; or

2. An external floating roof equipped with a liquid-mounted or mechanical shoe primary seal and a continuous rim-mounted secondary seal, with both seals meeting certain minimum gap requirements; and using gasketed covers; or

3. A closed vent system and a 95 percent effective control device. Equivalent control devices or procedures may be approved by the Administrator after notice and an opportunity for hearing.

The proposed standards would require that each new, modified, or reconstructed storage vessel, regardless of location, with a capacity greater than or equal to 75 m^3, storing a VOL with a maximum true vapor pressure greater than or equal to 76.6 kPa be equipped with a closed vent system and control device.

To determine applicability, the proposed standards would require that the owner or operator of each new, modified, or reconstructed storage vessel with a capacity greater than or equal to 40 m^3 storing a VOL, maintain a record of the capacity of the storage vessel. The proposed standards would also require that the owner or operator of each new, modified, or reconstructed storage vessel either with a capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a VOL with a maximum true vapor pressure greater than or equal to 15.0 kPa but less than 27.6 kPa or with a capacity greater than or equal to 151 m^3 storing a VOL with a maximum true vapor pressure greater than or equal to 1.75 kPa but less than 3.5 kPa, maintain a record of maximum true vapor pressure of the VOL.

The proposed standards for external floating roof vessels are identical to the requirements in the current petroleum liquid storage vessel standard, except that the proposed standards specify the type of primary seal that is to be used (i.e., liquid-mounted or mechanical shoe) and require gasketed covers for roof fittings. The proposed standards for fixed roof vessels have additional requirements that are not in the current petroleum liquid storage vessel NSPS; these include a liquid-mounted primary seal, gasketed fittings, and flexible fabric sleeve seals on pipe columns. The new requirements would not apply retroactively to petroleum liquid storage vessels already covered by Subparts K or Ka; only new, modified, or reconstructed vessels that commence construction after the proposal date of this standard would be subject to the new requirements.

EPA's Office of Solid Waste and Emergency Response (OSWER) is currently developing standards for storage vessels storing hazardous wastes. Some storage vessels could be affected by this NSPS and the hazardous waste storage standards. In such a situation, at a minimum the requirements of the NSPS would have to be met. Any additional requirement of the hazardous waste storage standard would also have to be met.

The owner or operator of each internal floating roof vessel subject to these standards would be required to inspect the internal floating roof and seals to help ensure that the equipment was being operated and maintained properly. The owner or operator would be required to inspect the floating roof and seals prior to filling the vessel with VOL to ensure that there were no holes in the internal floating roof and that there were no holes, tears, or other openings in the seals. Every 12 months thereafter, the owner or operator would be required to visually inspect the internal floating roof and seal from the fixed roof. If there are holes in the internal floating roof, or VOL accumulated on the roof, the owner or operator would have the options of repairing the control equipment within 30 days or of emptying the storage vessel within 30 days. At least once every 10 years, the owner or operator would be required to empty the storage vessel and to inspect the internal floating roof, the primary seal, and the secondary seal. The proposed standards would require that all defects in the control equipment be repaired before the vessel is refilled.

The owner or operator of each external floating roof vessel subject to these standards would be required to inspect the seals prior to filling the vessel with VOL to ensure that there were no holes, tears or other openings in the seal. Seal gap measurements of gaps between the seal and the vessel wall for both primary and secondary seals would be required for external floating roof vessels to ensure that the equipment was being maintained and operated properly. The owner or operator would be required to measure the gaps in both the primary and secondary seals within 60 days of introducting a VOL into the vessel. Every 12 months thereafter, the owner or operator would be required to perform secondary seal gap measurements. At least once every 5 years the owner or operator would perform primary seal gap measurements. Measured gaps that exceed specified limitations must be repaired within 30 days or the storage vessel must be emptied within 30 days.

It is also proposed to amend the reporting and recordkeeping provisions of Subpart Ka to be consistent with this revision (Subpart Kb) and require that reports be made only when the measured gaps exceed the specified limitations. Otherwise, records of gap measurements would be kept by the owner or operator.

The owner or operator of each affected facility equipped with a closed vent system and control device would be required to submit to the Administrator the system design specifications, an operation and maintenance plan, and an inspection plan for the system. The owner or operator would be required to operate, maintain, and inspect the system in accordance with the plans submitted to the Administrator.

Summary of Environmental, Energy, and Economic Impacts

Approximately 6,000 storage vessels would be affected by the proposed standards in the first 5 years. The proposed standards would reduce the national VOC emissions from new, modified, and reconstructed storage vessels by about 31,100 megagrams (Mg) in 1988. Emissions from the VOL storage vessels affected by these proposed standards are projected to be 33,200 Mg in 1988 without these proposed standards but would be only 2,100 Mg in 1988 with these proposed standards. The emission reduction obtained by these proposed standards is above and beyond that obtained by the implementation of other Federal or state regulations that limit emissions from storage vessels (baseline control). Existing regulations require that emissions from vessels with capacities of 151 m^3 or greater storing liquids with vapor pressures of 10.3 kPa or greater, be controlled through the use of either external floating roofs with primary and secondary seals or internal floating roofs. Some states require controls for vessels with smaller capacities and liquids with lower vapor pressures (Chapter 3 of the BID contains the precise regulatory framework). The proposed standards would reducue the national VOC emissions from storage vessels with no adverse impacts on other aspects of the environment. In addition, there would be no adverse energy impacts associated with the implementation of the proposed standards.

The total nationwide capital cost for affected facilities constructed through 1986 to comply with the proposed standards would be approximately $15.6 million. Because implementation of the proposed standards would retain liquids that would otherwise be lost, it would result in a net annualized credit in the fifth year (1988). For this reason, no price increases attributable to implementation of the proposed standards are expected.

To provide perspective on the capital cost that industry will face as a result of these proposed standards, it should be noted that the capital cost of constructing vessels at a new plant is expected to increase by no more than 6 percent. This percentage is the incremental capital cost of the controls compared to the cost of a baseline vessel at the model facilities presented in the BID. The percentage is conservative because it does not include foundation, pipes, pumps, and other items that are necessary for vessel operation. It also does not include the capital costs associated with other operations at the model facilities, such as process units. This small percentage increase in vessel costs is not expected to impede the construction of new facilities of any type.

Standards of performance have other benefits in addition to achieving reductions in emissions beyond those required by a typical State implementation plan (SIP). The standards provide documentation that reduces uncertainty in case-by-case determinations of best available control technology (BACT) for facilities located in attainment areas, and lowest achievable emission rates (LAER) for facilities located in nonattainment areas. This documentation includes identification and comprehensive analysis of alternative emission control technologies, development of associated costs, an evaluation and verification of applicable emission test methods, and identification of specific emission limits achievable with alternate technologies. Additionally, an economic analysis that reveals the impact of the cost of controls on industry is provided in the BID.

The rulemaking process that implements a performance standard assures adequate technical review and promotes participation of representatives of the industry being considered for regulation, the government, and the public affected by that industry's emissions. The resultant regulation represents a balance in which government resources are applied in a well-publicized national forum to reach a decision on a pollution emission level that allows for a dynamic economy and a healthful environment.

Moreover, the emissions from VOL storage vessels include a wide range of organic compounds, some of which are currently being studied for potential toxicity. The difficulties and time required to determine adverse health effects associated with these chemical emissions, will continue to make chemical-by-chemical control of toxic emissions a costly and uncertain process. Accordingly, an effective NSPS offers benefits beyond those associated with the reduction of VOC as an ozone precursor.

Rationale

Selection of Sources and Pollutants

The EPA priority list (40 CFR 60.16, 44 FR 49222, August 21, 1979) ranks, in order of priority for standards development, various source categories in terms of quantities of nationwide pollutant emissions, the mobility and competitive nature of each source category, and the extent to which each pollutant endangers public health and welfare. The priority list reflects the Administrator's determination that emissions from the listed source categories contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare, and is intended to identify major source categories for which standards of performance are to be promulgated.

The priority list ranked the source category entitled synthetic organic chemical manufacturing industry (SOCMI), including storage and handling equipment, first out of 59 listed source categories. The chemicals covered by the SOCMI source category include those made by chemical and biological synthesis.

There are storage vessels emitting VOC's locataed at plants other than SOCMI plants, such as liquid bulk storage terminals, that store the same or similar liquids as those at SOCMI plants and that can be controlled with the same effectiveness, the same costs (assuming the same vessel size), and the same control technology as storage vessels located at SOCMI plants. It is estimated that annual VOC emissions from SOCMI storage vessels were 24,570 Mg in 1977 as compared to an estimated 13,230 Mg from storage vessels not located at SOCMI plants. The same circumstances hold true for handling equipment, in that handling equipment located at plants other than SOCMI plants handle the same liquids and can be controlled with the same effectiveness, the same costs, and the same control technologies as handling equipment located at SOCMI plants. Also, additional emission reduction could be achieved by including handling equipment not located at SOCMI plants in this source category. Therefore, due to the similarities between VOC emitting storage vessels and handling equipment located at SOCMI plants and VOC emitting storage vessels and handling equipment not located at SOCMI plants, and due to the additional emissions reduction that can be achieved, the Administrator is proposing to expand the SOCMI source category to include VOC emitting storage vessels and handling equipment not located at SOCMI plants. This subcategory consisting of SOCMI storage vessels and handling equipment and non-SOCMI storage vessels and handling equipment is called volatile organic liquid storage vessels and handling equipment. (This **Federal Register** notice includes VOC requirements for VOL storage vessels only.)

The existing SOCMI category is organized within the priority list as follows:

1. Synthetic Organic Chemical Manufacturing Industry (SOCMI)
   a. Unit processes
   b. Storage and handling equipment
   c. Fugitive emission sources
   d. Secondary sources

The SOCMI category is, therefore, revised to include non-SOCMI as well as SOCMI storage vessels and handling equipment as follows:

1. Synthetic Organic Chemical Manufacturing Industry (SOCMI) and Volatile Organic Liquid Storage Vessels and Handling Equipment
   a. SOCMI unit process
   b. Volatile organic liquid (VOL) storage vessels and handling equipment
   c. SOCMI fugitive sources
   d. SOCMI secondary sources

Even though petroleum liquid storage vessels also store volatile organic liquids, the new VOL storage vessel category on the priority list does not include them. This is because petroleum liquid storage vessels were already listed as a category for NSPS development on June 11, 1973 (38 FR 15380). Standards of performance for these vessels were proposed and promulgated (40 CFR Part 60 Subpart K) and subsequently revised (40 CFR Part 60 Subpart Ka). When Subpart Ka was promulgated (April 4, 1980), the Agency stated that there was insufficient data to distinguish between various types of internal floating roofs, (i.e., contact versus noncontact roofs) and that further testing would be conducted to examine emissions from various floating roof designs. Since that time, the American Petroleum Institute (API) has completed a major emissions testing program on internal floating roofs. The results of this program have made it possible to determine the relative performance of different control options as well as the relative importance of the various emission points (i.e., roof versus seal emissions) in an internal flaoting roof. The API data, therefore, not only provide a basis for evaluating various types of internal floating roofs but also allow for evaluation of potential additional equipment specifications for internal floating roofs not now required by Subpart Ka. Section 111(b)(1)(B) of the Clean Air Act, as amended in 1977, requires the Administrator to, at least every 4 years, review and, if appropriate, revise standards of performance. After evaluating the API data, the Administrator has determined it is appropriate to review and revise the promulgated standards for petroleum liquid storage vessels at this time.

The API test program compared emissions from multicomponent liquids (such as gasoline) and from single component liquids (such as hexane) and found them to be essentially the same. Storage vessels in the petroleum liquid storage vessel category generally store multicomponent liquids, and storage vessels in the VOL storage category generally store single component liquids. Therefore, the API test program is used as the basis for determining control requirements for both categories.

The API test work was used in this revision of Subpart Ka for petroleum liquid storage vessels. The API test work was also used as the basis for selecting BDT for the other storage vessels in the VOL storage category. (The selection of BDT for both categories is discussed later in this preamble.) After determining BDT for both categories it was found that the control equipment requirements were the same for vessels storing petroleum liquids and vessels storing other VOL's. Therefore, the Administrator has decided that these two categories of storage vessels should be combined into one NSPS, rather than having two NSPS's with the same requirements. Consequently, the proposed standards would apply to petroleum liquid storage vessels and VOL storage vessels. (**Note.**—since petroleum liquids are in fact volatile organic liquids, the actual standards refer only to volatile organic liquids with the intention of also including petroleum liquids.)

The annual growth rate of the storage vessel population is expected to be approximately 3 percent through 1988. Between 1983 and 1988, new storage vessels could cause an increase in nationwide VOC emissions of 33,210 Mg. Because VOC is the only criteria pollutant emitted from this source category, the proposed standards do not include particulate matter, nitrogen oxides, sulfur dioxide, carbon monoxide, or lead. It is estimated that total VOC emissions from storage vessels were 714,280 Mg in 1977 or about 3 percent of the national total.

Selection of Affected Facilities

Facilities affected by the proposed standards are storage vessels that contain organic liquids from which VOC's can be emitted to the atmosphere. A "VOC" is defined as any organic compound that participates in atmospheric photochemical reactions. An organic compound is considered to be photochemically reactive unless the Administrator has determined otherwise. Examples of liquids that would be affected by the proposed standards are hexane, acetone, and benzene.

The promulgated standards for petroleum liquid storage vessels specifically exempted vessels with a capacity less than 420,000 gallons and storing petroleum (crude oil) and condensate prior to custody transfer (production vessels). The emission controls that are applicable to the storage vessels included in the standards being proposed are not applicable to production vessels. Therefore, it was decided to also exempt production vessels from these proposed standards.

Storage vessels are also used to store VOL's at coke oven by-product plants. The applicable control techniques for storage vessels at coke oven by-products are different than the ones considered for the storage equipment covered by the standards being proposed. This is a function of the uniqueness of coking and by-product processes. Therefore, the Agency determined that a separate standard for vessels at coke oven by-product facilities is appropriate and that such vessels should not be covered by these standards.

Vessels storing gasoline exist at small distribution centers, referred to as bulk plants. As a result of State regulations, many bulk plants control fixed-roof working losses and tank truck loading losses through a vapor balance system. It would not be possible to equip vessels at bulk plants with the controls that would be required by these proposed standards and to continue the vapor balance system. Therefore, it was decided to exempt bulk plants that are part of the vapor balance system from these proposed standards.

A variety of vessel types are used to store organic liquids. One such type of vessel is a pressure vessel. Pressure vessels are designed to withstand large internal pressures. They are generally used for storing highly volatile and/or toxic materials and are constructed in various sizes and shapes, depending on the operating pressure. Noded spheroid and hemispheroid shapes are generally used for low pressure storage and are operated at pressures up to about 204 kPa (≅30 psia); horizontal cylinder and spheroid designs are typically used for high pressure storage (up to 1,827 kPa). Because high pressure vessels operating above 204.9 kPa are operated in a closed system at the pressure of the stored material, they have no emissions to the atmosphere. Therefore, these vessels are exempt from the proposed standards.

In the proposed standards each individual storage vessel is designated as the affected facility. This designation assures that new vessels are brought under the coverage of these standards when they are installed. No cost, environmental, or other factors were identified that would support a broader definition of the affected facility.

The components of storage vessels were examined to determine the parts that together constitute the affected facility. The vessel shell, fixed roof (if any), hatches (if any), floating roof (if any), vessel bottom, seal system (if any), and pressure-vacuum valve (if any) comprise the portion of the vessel in direct contact with liquid or vapor. Because of this, it was decided to include all of these components in the affected facility. It was decided not to include frames or other auxiliary supports and housings because they are not directly involved in the containment of liquid or vapor. Therefore, if construction of a new storage vessel is commenced after the proposal date using, in whole or in part, frames or other auxiliary supports from a storage vessel constructed prior to today's date, the storage vessel will be considered a new source. Similarly, in calculating the fixed capital cost of replacing components at an existing facility to determine if a reconstruction has occurred as defined by § 60.15, the fixed capital cost of the frame or other auxiliary equipment will not be included.

The Administrator decided to further distinguish among types and sizes of vessels within the source category. Storage vessels with capacities less than either 151 m^3 (≅40,000 gallons) or that store liquids with a maximum true vapor pressure of less than 3.5 kPa (0.5 psia) would not be required to control VOC emissions under these proposed standards, except if the capacity of the vessel is greater than or equal to 75 m^3 (≅20,000 gallons) and the stored liquid has a maximum true vapor pressure of 27.6 kPa (≅4.00 psia) or greater. Rationale for this is presented later in the section entitled Selection of Vessel Capacity and Vapor Pressure Exemption Points. To determine applicability under these proposed standards, monitoring is required of organic liquids that are stored in affected facilities containing organic liquids either with a maximum true vapor pressure greater than or equal to 1.75 kPa (0.25 psia) for capacities greater than or equal to 151 m^3 (≅40,000 gallons) or a maximum true vapor pressure greater than or equal to 15.0 kPa (2.2 psia) for capacities greater than or equal to 75 m^3 (≅20,000 gallons). This requirement is explained in the section entitled Selection of Monitoring of Operations Requirements.

In summation, each storage vessel either with a capacity greater than or equal to 75 cubic meters but less than 151 cubic meters that stores an organic liquid that can produce VOC vapors with a maximum true vapor pressure greater than or equal to 15.0 kPa or with a capacity greater than or equal to 151 cubic meters that stores an organic liquid that can produce VOC vapors with a maximum true vapor pressure greater than or equal to 27.6 kPa, would be an affected facility under these proposed standards, unless: (a) The vessel contains crude oil or condensate prior to custody transfer and has a volume less than 1,590 m³ (420,000 gallons); or (b) the vessel containing the organic liquid is associated with a coke oven by-product facility; or (c) the vessel is a pressure vessel, designed to operate as a closed system at pressures of 204.9 kPa or greater; or (d) the vessel is located at a bulk plant that is part of the vapor balance system.

Selection of the Basis for the Proposed Standards

In examining candidate BDT's for new storage vessels, the types of vessels that could be constructed—fixed roof vessels and external floating roof vessels—were considered separately.

The API test program, which was discussed earlier, measured emissions from fixed roof vessels equipped with internal floating roofs to control emissions. For vessels equipped with an internal floating roof, there are three primary sources of emissions. First, there can be VOC emissions from the seams or joints of the internal floating roof. Second, VOC can be emitted through the space between the internal floating roof and the vessel wall. Third, VOC can be emitted through the fittings or openings (e.g., hatches, column wells, and sample wells) on the internal floating roof. Using the API test data, the Agency has evaluated the relative effectiveness of various control equipment for each of these emission sources.

The API test program tested bolted and welded internal floating roof decks. Bolted roofs are constructed of sheets or panels that are mechanically joined or fastened together. The data show that the seams where the sheets are joined together are emission points. A bolted internal floating roof may float directly in contact with the liquid surface (contact roof) or may be supported by pontoons several centimeters above the liquid surface (noncontact roof). Welded roofs are constructed of steel sections welded together. Welded roofs have no seams and, therefore, no deck seam emissions. Welded roofs are always the contact type.

The API test program tested several seals used for reducing emissions from the space between the internal floating roof and the vessel wall. This space is sealed off by a primary seal. In some cases a second seal, above the primary seal, may also be used. In this case, the upper seal is referred to as the secondary seal.

There are three basic designs for primary seals: (1) Vapor-mounted; (2) liquid-mounted; and (3) mechanical shoe seals. Vapor-mounted primary seals are not in contact with the liquid surface, and this allows for a vapor space between the underside of the seal and the liquid surface. One type of vapor-mounted seal is a resilient foam-filled seal. A resilient foam-filled seal is a tough fabric band filled with a resilient foam log. The resiliency of the foam log permits the seal to adapt itself to some imperfections in vessel dimensions or in the vessel shell. Another type of vapor-mounted seal is an elastomeric wiper.

A liquid-mounted seal is in direct contact with liquid. These seals are similar in construction to resilient foam-filled seals. These seals may also be filled with a liquid in place of foam.

A mechanical shoe seal is characterized by a metallic sheet known as the "shoe," which is held against the vessel wall. A flexible coated fabric (the "envelope") is suspended from the shoe to the floating roof to form a cover over the space between the roof and vessel wall.

As previously mentioned, rim-mounted secondary seals can be installed over any of the above primary seal types. Rim-mounted secondary seals are always vapor mounted.

The data show that installing a secondary seal over the primary seal will reduce emissions from the seal area. The data also show that the installation of a liquid-mounted primary seal rather than a vapor-mounted primary seal will reduce emissions from the seal area. No data on emissions from mechanical shoe seals in internal floating roof vessels are available.

There are numerous fittings that penetrate the internal floating roof deck. Some typical fittings are: (1) Hatches in the deck; (2) ladder penetration or wells; and (3) column wells. Columns may support the fixed roof above the internal floating roof. These columns may be built up (structural shapes with irregular cross sections) or pipe columns (cricular cross sections). Fittings can be a source of emissions and are typically covered. Gasketing, and where possible, bolting the covers, reduces emissions from fittings. Emissions from gasketed or ungasketed column well covers may be reduced by using flexible fabric sleeve seals to seal off the deck penetration. These seals may only be used with pipe columns.

Fundamentally, the available data show that constructing a new fixed roof vessel with an internal floating roof instead of a fixed roof only is effective in reducing emissions. The API data also show that emissions from the internal floating roof vessel could be further reduced by using: (1) Liquid-mounted primary seals rather than vapor-mounted primary seals; (2) gasketed fittings; (3) pipe columns equipped with flexible fabric sleeve seals rather than built-up columns with sliding covers (gasketed or ungasketed); (4) continuous rim-mounted secondary seals; and (5) welded rather than bolted decks. All of these control options were considered in selecting BDT. These controls are described more fully in the BID.

Industry also conducted extensive testing on external floating roof vessels. These vessels have the same emission sources as the internal floating roofs except that all external floating roofs are welded; therefore, there are no seam emissions. Using this data, the Agency has evaluated the relative effectiveness of various control equipment for each of these emission sources.

The data for external floating roofs show the comparative emissions reduction of several types of seal systems. The data show that emissions from a new external floating roof vessel with vapor-mounted primary seals only could be reduced by installing continuous rim-mounted secondary seals. Emissions from this primary and secondary seal combination could be further reduced through the use of a liquid-mounted primary seal (in lieu of the vapor-mounted primary seal) with a continuous rim-mounted secondary seal. In addition, the data show that a mechanical shoe primary seal in conjunction with a continuous rim-mounted secondary seal is as effective as a liquid-mounted primary seal with a continuous secondary seal. In the analysis, however, cost impact numbers are presented only for the liquid-mounted seal because it costs less than a mechanical shoe seal. In selecting BDT, all of these control options were considered.

The costs of the storage vessel control techniques are small relative to the capital and operating costs of the process units where the vessels are located. As a consequence, none of these control techniques impact the ability of an owner or operator to raise capital nor do they measurably impact product prices. The economic analysis concluded that no unreasonable adverse economic impacts would occur as a result of using any of the control techniques investigated. Therefore, the Agency selected BDT based primarily on a comparison of incremental costs and emission reductions associated with each alternative control technique. Incremental costs and emission reductions are calculated by taking the difference between the emissions and annualized costs of one control option and the next less stringent control option. The control options considered were arranged in order of increasing cost effectiveness. In selecting BDT, the Agency selected control techniques that achieve the most emission reduction with reasonable incremental control costs per megagram of emission reduction (incremental cost effectiveness). The basis of selecting BDT for each type of storage vessel is discussed in detail below.

New Fixed Roof Vessel

New fixed roof vessels can be built to include internal floating roofs. The control options for fixed roof vessels and their associated cost appear in Table 1. Internal floating roofs are already required for many vessels by the NSPS for petroleum liquid storage vessels, which requires, as the minimum level of control for fixed roof vessels greater than 151 m^3 (40,000 gallons) storing a liquid with a true vapor pressure of 10.3 kPa (1.5 psia), the installation of internal floating roofs with vapor-mounted primary seals. The cost effectiveness of this control option on the model fixed roof vessel is about $40 per Mg. The second level of control that can be applied is the use of a liquid-mounted primary seal rather than a vapor-mounted primary seal. This results in a savings rather than a cost. The next step is to control fitting losses by gasketing covers and by the use of pipe columns with sleeve seals. The incremental cost of controlled fittings over uncontrolled fittings is about zero. The costs of equipping an internal floating roof with a liquid-mounted primary seal and controlled roof fittings are considered reasonable, and therefore, these controls were selected as BDT for new fixed roof storage vessels.

TABLE 1.—CONTROL OPTIONS FOR NEW STORAGE VESSELS

Vessel types	Control technique [1]	Incremental cost effective-ness—$/Mg
I. Fixed roof vessel storing liquids with vapor pressures <76.6 kPa.	*Internal roof/vapor-mounted primary seal*	41
	Liquid-mounted primary seal [2]	Credit
	Gasket fittings [3, 4]	[5]0
	Secondary seals	23,400
	Welded deck seams	77,900
II. External roof with vapor-mounted primary seal; storing liquids with vapor pressures <76.6 kPa.	Secondary seal	Credit.
	Liquid-mounted primary seal, or mechanical shoe seal; with secondary seal.	Credit
III. Vessels storing high pressure liquids (>76.6 kPa)	*Closed vent system and control device*	[5] 63

[1] Control techniques selected as BDT are italicized.

[2] A mechanical shoe seal is also allowed in place of a liquid-mounted primary seal.

[3] Uncontrolled assumes: (1) Access hatch, with ungasketed, unbolted cover; (2) automatic gauge float well, with ungasketed, unbolted cover; (3) built-up column wells, with ungasketed sliding cover; (4) ladder well, with ungasketed sliding cover; (5) adjustable roof legs; (6) sample well with slit fabric (10% open area); (7) 1-inch diameter stub drains; and (8) vacuum breaker with, gasketed weighted mechanical actuation.

[4] Control consists of (1) access hatch, with gasketed, bolted cover; (2) automatic gauge float well, with gasketed, bolted cover; (3) built-up column wells, with gasketed sliding covers; (4) ladder well, with gasketed sliding cover; (5) adjustable roof legs; (6) sample well with slit fabric (10% open area); (7) 1-inch diameter stub drain; and (8) vacuum breaker, with gasketed weighted mechanical actuation.

[5] These controls are also required by the current NSPS and by typical SIP's.

In some instances it may not be possible to equip an internal floating roof with a liquid-mounted primary seal. The corrosive or solvent properties of some liquids are such that they will destroy the polymeric fabric that encapsulates the seal. Owners or operators of such affected facilities could comply with the proposed standards by installing a closed vent system and control device. However, the cost effectiveness of requiring this would be unreasonably high. Therefore, the EPA examined other seal technologies.

Mechanical shoe primary seals can be used in a wide variety of liquids with solvent and corrosive properties. The portions of the seal that are normally metallic may be constructed of, or coated with, materials that will be compatible with the stored liquid. There are no emissions test data on the performance of mechanical shoe seals on internal floating roof vessels. But tests on external floating roof vessels storing petroleum liquids have demonstrated that the emission reduction capability of mechanical shoe seals is slightly less than that of liquid-mounted seals, but greater than that of vapor-mounted seals.

Mechanical shoe seals are more costly than liquid-mounted seals, and extensive modifications to the design of an internal floating roof (particularly noncontact internal floating roofs) may be necessary to equip an internal floating roof with a mechanical shoe seal. Because of the higher cost, it is unlikely that an allowance for mechanical shoe seals would result in these seals being installed in internal floating roof vessels unless liquid-mounted seals cannot be used. Because of the wide variety of liquids that may be stored in affected facilities and the variations of seal material, it is not possible to develop a list of instances in which mechanical shoe seals would be allowed in place in liquid-mounted seals. Therefore, mechanical shoe seals were also selected as BDT for new fixed roof storage vessels.

There are still other control options to be considered. The next control option to consider is the addition of a secondary seal over the liquid-mounted primary seal. The incremental cost effectiveness of this for the model vessel in Table 1 would be about $23,400 per Mg. This was judged to be unreasonable, and secondary seals were rejected as BDT. Since the cost effectiveness of installing a secondary seal over a primary seal is independent of vessel diameter and would not vary with vessel size, secondary seals were not selected as BDT for vessels larger than the model vessel because the incremental cost effectiveness would still be unreasonable. The Agency then examined the incremental cost effectiveness of adding the secondary seal for liquids that have higher vapor pressures. Increasing the vapor pressure of the stored liquid from 6.8 kPa to 38 kPa (≅5 psia is a vapor pressure typical of motor gasoline, which is the most commonly stored petroleum liquid) would decrease the incremental cost effectiveness from about $23,400 per Mg to about $4,550 per Mg. This was also judged to be unreasonable. Supported by these analyses, the cost effectiveness of secondary seals was considered unreasonable, and on this basis, they were rejected as BDT for all vessel sizes and liquid vapor pressures.

Another control option would be to control deck seam emissions by requiring welded decks. The incremental cost effectiveness of this for the model vessel in Table 1 would be about $78,000 per Mg. This was judged to be unreasonable, and welded deck seams were rejected as BDT. Increasing the vessel diameter from 10 meters to 30 meters and increasing the stored liquid vapor pressure from 6.8 kPa to 38 kPa, would decrease the incremental cost effectiveness from $78,000 per Mg to $8,800 per Mg in the model vessel. This was still considered unreasonable, and this control option was again rejected as BDT for all vessel sizes and liquid vapor pressures.

As the vapor pressure of a stored liquid increases to atmospheric pressure the liquid boils. The control technologies selected as BDT are not appropriate to boiling liquids. There are no test data on internal floating roof vessels storing liquids with vapor pressures higher than 47 kPa; therefore, there is some uncertainty in the effectiveness of the controls as the vapor pressure increases to the boiling point (101 kPa). The current petroleum liquid storage vessel NSPS and typical state implementation plans (SIP's) require a closed vent system and control device for vessels storing liquids that have vapor pressures greater than or equal to 76.6 kPa (11.1 psia). Because liquids with vapor pressures greater than 76.6 kPa may reach the boiling point on high temperature days, and because the BDT control technologies previously selected are inappropriate for boiling liquids, the Agency decided that BDT for vessels storing such liquids should be a closed vent system and control device rather than an internal floating roof with a liquid-mouthed primary seal and controlled fittings. Liquids with vapor pressures less than 76.6 kPa are not likely to reach the boiling point on high temperature days, and the internal floating roof with a liquid-mouthed primary seal and controlled fittings is appropriate in these cases.

New External Floating Roof Vessel

Table 1 presents the control options for new external floating roof vessels and their associated costs. New external floating roof vessels with vapor-mounted primary seals only, could be built as external floating roof vessels equipped with vapor-mounted primary seals and continuous secondary seals. This is the minimum required by the NSPS for petroleum liquid storage vessels, and as such, this level of control is already required for many vessels. This level of control results in a savings rather than a cost. The next control option considered is a liquid-mounted primary seal with a continuous secondary seal rather than the vapor-mounted primary seal with a continuous secondary seal. The incremental cost effectiveness of requiring this control option over the base case (vapor-mounted primary seal with a secondary seal) is a credit. A mechanical shoe primary seal with a continuous secondary seal has similar costs and achieves emission reductions similar to the liquid-mounted primary seal in conjunction with a secondary seal. The next option is control of the roof fittings as required for internal floating roof vessels. It is not possible from the data available for external floating roofs to quantify the emissions from uncontrolled roof fittings. In the EPA's judgment, the effectiveness cost of controlling fitting emissions from external floating roofs is substantially the same as for internal floating roofs for two reasons. First, the costs of gasket material are small; thus, the variability in the numbers of types of fittings between types of vessels would not incur a significant differential in total gasket costs. In addition, some of the types of fittings that would require control on external floating roof vessels are essentially the same as those on internal floating roof vessels. These factors cause the costs of controlling fittings to be very nearly the same. Secondly, emission tests confirm that fitting emissions are independent of wind speed; the anticipated emissions from either type of vessel are, therefore, approximately equal, and subsequently, the cost effectiveness in each case will also be approximately equal. There are no additional control options that will achieve more emission reduction than those options already considered. Therefore, BDT for new external floating roofs is a liquid-mounted primary seal with a continuous rim-mounted secondary seal or a mechanical shoe primary seal with a continuous rim-mounted secondary seal and controlled roof fittings.

As previously explained when discussing internal floating roof vessels, both the cost and emissions of seal systems are directly proportional to the diameter of the vessel. Therefore, as the vessel diameter increases, the cost effectiveness of BDT will remain constant and would still be reasonable. As the vapor pressure of the stored liquid increase, the emissions reduction increases, and therefore, the product recovery credit obtained by BDT controls grows even larger. Therefore, BDT still results in a credit, not a cost, and it is reasonable to require BDT for larger vessels and vessels storing liquids up to 76.6 kPa.

However, as noted before for fixed roof vessels (and for the same reasons), the floating roof and seal system controls that comprise BDT are not appropriate for high pressure liquids. BDT for vessels storing liquids with a vapor pressure greater than or equal to 76.6 kPa is a closed vent system and control device. It should be noted that vessels storing these high pressure liquids would not be built as external floating roof vessels. External floating roof vessels are not enclosed and, therefore, have no vents. Rather than constructing an external floating roof vessel, an owner or operator wishing to store a high pressure liquid would construct a fixted roof vessel with a closed vent system and control device attached. Therefore, the BDT controls for high pressure liquids have been separated in Table 1 from the floating roof and seal system BDT controls.

The equipment selected as BDT for external floating roof vessels has a calculated emissions rate that is lower than the equipment selected as BDT control for fixed roof vessels. However, the cost effectiveness of building the model vessel as a BDT external floating roof vessel rather than an internal floating roof vessel with a liquid-mounted primary seal and controlled fittings is estimated to be $11,700 per Mg. This was judged to be unreasonable. Therefore, the Agency rejected the requirement that all storage vessels be equipped with external floating roofs.

Environmental, Economic, Nonair Quality, and Energy Impacts of BDT

The emission reduction due to the implementation of BDT is estimated to be 31,100 Mg in the fifth year of implementation (1988). In the calculation of these impacts it was assumed that 80 percent of the new external floating roof vessels that would have been affected facilities under the current NSPS for petroleum liquids storage vessels would have been equipped with mechanical shoe seals and not vapor-mounted primary seals. This ratio is based on a 1977 distribution of shoe seals to resilient seals. The major portion of the emission reduction ($\approx$20,000 Mg) is obtained by building new floating roof vessels (internal and external) in place of fixed roof vessels. Most of the remaining emission reduction is obtained by requiring liquid-mounted primary seals rather than vapor-mounted primary seals on new internal and external floating roof vessels.

The fifth year capital and annualized cost of implementing BDT are estimated to be $15.6 million and a credit, respectively. These costs are judged to be reasonable. There are no adverse nonair quality or energy impacts associated with the floating roof and seal control techniques selected as BDT. Therefore, after considering the impacts of BDT on vessels storing liquids with vapor pressures less than 76.6 kPa, the internal floating roof, liquid-mounted primary seal and controlled fittings, or the external floating roof with a liquid-mounted or mechanical shoe seal, and continuous secondary seal and controlled fittings, continued to be selected as BDT.

There are no impacts attributable to the requirement that vessels storing high pressure liquids be equipped with closed vent systems and control devices. The current NSPS for petroleum liquid storage vessels and typical SIP's require closed vent systems and control devices for vessels storing high pressure liquids. Therefore, no impacts (emission reduction, costs, energy, and nonair quality) were attributed to the proposed standards as a result of the requirements on vessels storing high pressure liquids (less than or equal to 76.6 kPa).

Selection of Format for the Proposed Standards

Section 111 of the Clean Air Act requires an emission standard whenever it is feasible. Section 111(h) states that "if in the judgment of the Administrator, it is not feasible to prescribe or enforce a standard of performance, he may instead promulgate a design, equipment, work practice, or operational standard, or combination thereof . . ." The term "not feasible" is applicable if the emissions cannot be captured and vented through a vent or stack designed for that purpose, or if the application of a measurement methodology is not practicable because of technological or economic limitations.

Determining compliance with an emission standard for storage vessels would require the measurement of emissions from each storage vessel; therefore, the emission would have to be vented in a manner that would allow the measurement of pollutant concentration and flow rates. Internal and external floating roof storage vessels do not typically have a conveyance design to capture the emissions or a stack or vent through which the emissions pass to the atmosphere.

Internal floating-roof vessels are typically vented to minimize the possibility of hydrocarbons accumulating in concentrations approaching the flammable range. As ambient wind flows over the exterior of the vessel, air will flow into the enclosed space between the fixed and floating roofs through some of the shell vents and out of the enclosed space through others. Any VOC vapors that have evaporated from exposed portions of the liquid surface or that have been contained by the deck or seal system will be swept out of the enclosed space.

Equipping each storage vessel with a capture and stack system would require that the vessel vents be sealed and that the emissions be transported to a measurement system. In most cases, the closure of the vessel vents would require the vessel to be blanketed with inert gas to prevent the creation of explosive or flammable mixtures in the vessel or measurement system. This would certainly be economically impracticable, especially considering that the sole purpose of the system would be for emissions testing. For this reason, the Administrator concluded that establishing an emission standard is not feasible for internal floating roof storage vessels.

As previously stated, external floating roof vessels are open to the atmosphere in that they have no fixed roof. Because of this, it is technoligically impossible to equip these vessels with a closed vent system. It is possible to equip these vessels with fixed roofs. If this is done, the vessel would be an internal floating roof vessel, and the rationale for not establishing an emission standard for internal floating roof vessels would still hold. Therefore, the Administrator concluded that establishing an emission standard for external floating roof vessels is infeasible.

The possibility of establishing a "design, equipment, work practice, or operational standard, or combination thereof" was then examined. The equipment that comprises BDT for vessels storing affected liquids with vapor pressures less than 76.6 kPa consists of certain equipment and design requirements. This equipment is an internal floating roof with a liquid-mounted primary seal and controlled fittings, or an external floating roof with a liquid-mounted or mechanical shoe primary seal, a continuous rim-mounted secondary seal, and controlled fittings. Operational and work practice requirements, which consist of inspection and repair requirements, are necessary to ensure the continued integrity of the control equipment. Therefore, the Administrator concluded that the format of the standards for these vessels should include a combination of a design, equipment, work practice, and operational standards.

A vapor control system consists of two distinct parts: (1) A closed vent system and (2) a control device. The closed vent system collects VOC vapors that have been vented from the storage vessel and transfers them to a control device that then processes the VOC vapors by either recovering them as product or disposing of them. The EPA considered an emission standard for storage vessels that are controlled with closed vent systems and control devices or disposal systems. The first possibility that was considered was a mass emission limitation.

Closed vent systems and control devices are generally used in conjunction only with fixed roof vessels. Fixed roof vessel mass emissions vary considerably as a function of vessel capacity, vapor pressure of the stored liquid, the molecular weight of the stored liquid, and the utilization rate of the storage vessel. Because of the wide variation in the amount of VOC vapors being emitted from storage vessels, a mass emission limit cannot be selected that would be achievable on a worst-case basis (i.e., large vessel capacity, high vapor pressure, and high utilization rate), and at the same time would not allow the construction of closed vent systems and control devices that are less effective than BDT. On this basis, the Administrator rejected any type of mass emission format for this section of the proposed standards.

The possibility of establishing reduction efficiency emission standards for vessels controlled by closed vent systems and control devices or disposal systems was then examined. Emissions from storage vessels are variable and are often at low rates that are too low to measure. When liquid is entering a vessel, the liquid surface rises, forcing vapors above the liquid surface out of the vessel. While this is occurring, the vapor flow rate and the emissions are large. When liquid is exiting the vessel, the liquid surface falls, and the resulting pressure differential sucks air or a blanketing material into the vessel. During these operations, vapor flows into the storage vessel resulting in no atmospheric emissions. When the liquid level is held constant, pressure differentials resulting from diurnal temperature variations expel vapors at very low flow rates at intermittent times during the cycle.

Certain components of uncontrolled emissions have been measured in very specialized tests conducted by the EPA and industry. Total emissions have not been measured, however, and to do so would require that the operation of the vessel be strictly controlled during the testing period. Because of methodology problems, it may not be possible to measure both the flow rate and the concentration simultaneously. This would cast doubt on the accuracy of the measurement. For these reasons, it was concluded that it was impracticable to measure the emissions existing the storage vessel. For the same reasons, it would be impracticable to measure the emissions captured by the closed vent system or entering the control device. Therefore, it was concluded that reduction efficiency standards are not feasible for closed vent systems and control devices.

Because reduction efficiency cannot be measured practically, it is infeasible to establish an emission standard requiring a reduction efficiency. A design standard requiring a reduction efficiency design specification, however, is feasible. The possibility of establishing a "design, equipment, work practice, or operational standard, or combination thereof" was, therefore, examined. A reduction efficiency design standard has the advantage in that it accounts for the wide variation in emission and flow rates being vented from the vessel, and it would require the use of BDT closed vent systems and control devices on all vessels equipped with these controls. Operational requirements, which consist, among other things, of inspection, repair, and work practice requirements, are necessary to ensure the proper operation and integrity of control equipment meeting a reduction efficiency design standard. Therefore, the Administrator concluded that the format of the standards for storage vessels equipped with closed vent systems and control devices should include a combination of a design, equipment, work practice, and operational standard.

Selection of Equipment Specifications

Closed vent systems and control devices were selected as BDT for vessels storing high pressure liquids (>76.6 kPa). In specifying the efficiency for the control system, EPA notes that some control devices such as incineration are capable of achieving a 98 percent emission reduction. However, there are a number of other control technologies, such as condensers, that have not demonstrated this level of efficiency and that have other benefits. Although there are no data to demonstrate exactly what efficiencies can be achieved in a continuous manner on an industry wide basis, it is believed that a level of 95 percent would allow the use of these alternate control technologies. Therefore, the costs and benefits of 98 percent control versus 95 percent control were examined.

Recovery devices such as adsorbers and condensers generate recovery credits. Available data show that the capital cost of a 95 percent efficient condenser is less than 50 percent of the cost of a 98 percent efficient incinerator and that the annualized operating cost, without product recovery credits, may be only 30 percent of the annualized operating cost of a 98 percent efficient incinerator. The incremental cost effectiveness of a 98 percent effective incinerator over a 95 percent effective condenser is estimated to be about $25,000 per Mg. On this basis, and because of the costs and the energy requirements associated with higher levels of control, the EPA elected not to revise the 95 percent control level selected by the current NSPS. Therefore, the efficiency specified for closed vent systems and control devices is 95 percent.

The closed vent system must be designed so as to be capable of collecting all VOC vapors and gases discharged from the storage vessel. The control device must be designed to reduce the VOC emissions discharged into it at an efficiency of at least 95 percent by weight and must be operated at the design specifications to achieve this emissions reduction.

Mechanical shoe primary seals are allowed for external floating roof vessels storing liquids with vapor pressures less than 76.6 kPa. If the lower end of the shoe does not extend into the liquid, the seal will be, in effect, a vapor-mounted seal. Therefore, the standards specify that the lower end of the seal will extend into the liquid. To continuously hold the envelope above the liquid, the other end must extend at least 61 cm (24 in.) above the liquid surface. If there are holes or tears on the envelope, the seal will not be an effective control device. Therefore, the standards specify that there will be no holes or tears in the envelope.

Selection of Equivalent Equipment

Equivalent control devices or procedures may be approved by the Administrator after notice and an opportunity for hearing, if the equipment or procedure is demonstrated to be equivalent in reducing emissions to the equipment required by the proposed standards. Equivalence to the controls specified as BDT could be demonstrated by a number of methods including: (1) An actual emissions test that uses a full-size or scale-model storage vessel that accurately collects and measures all VOC emissions from the storage vessel, or (2) an engineering evaluation as approved by the Administrator.

One system that the Administrator has already determined to be equivalent to the floating roof and seal systems specified as BDT for vessels storing liquids with vapor pressures less than 76.6 kPa, is the control system specified for storage vessels with vapor pressures greater than or equal to 76.6 kPa, i.e., a closed vent system combined with a 95 percent efficient (by weight) control device.

The emissions test data also show that, on an internal floating roof, a vapor-mounted primary seal in conjunction with a continuous secondary seal has lower emissions than a liquid-mounted primary seal only. Therefore, the Agency decided that internal floating roofs equipped with a vapor-mounted primary seal and a continuous secondary seal are equivalent to internal floating roofs equipped with a liquid-mounted primary seal only.

Selection of Vessel Capacity and Vapor Pressure Exemption Points (Cutoffs)

Section 111(b)(2) of the Clean Air Act gives the Administrator the authority to distinguish among classes, types, and sizes of sources within a source category. The emission reduction obtained by an internal floating roof with a liquid-mounted primary seal and controlled fittings or by an external floating roof with a liquid-mounted primary seal, secondary seal, and controlled fittings decreases with decreasing vessel size and vapor pressure. Furthermore, the costs of the control equipment is independent of liquid vapor pressure. However, as vessel size decreases, the costs of control do not decrease in proportion to the decrease in emission reduction, i.e., the decrease in emission reduction is smaller than the decrease in cost. As a result, the cost effectiveness of BDT increases rapidly as the capacity of the storage vessel decreases. The same trend is also true of liquid vapor pressure. As liquid vapor pressure decreases, BDT becomes increasingly less cost effective. Recognizing these relationships of control costs versus tank size and stored liquid vapor pressure, various combinations of tank size and vapor pressure were analyzed to determine if there is some point at which the costs of control become unreasonably high.

As part of this analysis, the Agency examined the cost effectiveness of equipping an individual tank with BDT controls. Small capacity vessels (less than 1,000 gallons) are used at research laboratories, retail outlets, and other small facilities. The control technology required by the proposed standard is not applicable to vessels of this small size. The amount of VOC emissions from this type of facility is generally negligible. Also, BDT (internal and external floating roofs) controls are not typically available in small vessel volumes and diameters. Because external floating roof vessels are typically not constructed with volumes less than 130,000 gallons (490 m^3), in examining the cost effectiveness of controlling vessels with volumes less than 40,000 gallons (151 m^3), it was assumed that these vessels would be built as fixed roof vessels, not external floating roof vessels. The current petroleum liquids NSPS as well as typical SIP's have volume and vapor pressure cutoffs of 40,000 gallons and 1.5 psia (10.3 kPa), respectively. The cost effectiveness of equipping a 40,000 gallon fixed roof vessel storing a liquid with a vapor pressure of 1.5 psia with BDT is $450 per Mg. This was judged to be reasonable, and the EPA decided that emissions from such vessels should be controlled.

The Agency then focused on the cost effectiveness of lowering the cutoff volume or vapor pressure from 40,000 gallons and 1.5 psia. The available data indicate that lowering the vapor pressure cutoffs provides more nationwide emission reduction than does lowering the volume cutoff. Therefore, it was decided to examine the cost effectiveness of first lowering the vapor pressure cutoff. Vapor pressures of 1.0 psia (6.9 kPa), 0.5 psia (3.5 kPa), and 0.25 psia (1.75 kPa) were examined. A cost effectiveness of requiring controls for an individual vessel with a volume of 40,000 gallons storing a liquid with a true vapor pressure of 0.5 psia is about $1,900 per Mg, assuming a recovery credit of $360 per Mg. This value is representative of very low priced liquid chemicals and has been used in the cost analysis of most of this standard. However, the value of the chemicals between 0.5 psia and 1.0 psia typically is much greater than $360 per Mg. The average value of chemicals in this vapor pressure range is $695 per Mg. Using this more realistic average value for chemicals yields a cost effectiveness of about $1,400 per Mg, rather than $1,900 per Mg, for a 40,000 gallon tank.

The cost per ton for control decreases rapidly as the vapor pressure, or tank volume, or both increase. Thus, the control of tanks with larger, more typical volumes (on the order of 160,000 gallons) in this vapor pressure range would result in a net annual credit rather than a cost. Excluding petroleum liquids (such as crude oil and gasoline), the average cost of controlling liquids with vapor pressures between 0.5 and 1.0 psia, in tanks greater than or equal to 40,000 gallons, is $240 per Mg (assuming a recovery credit of $360 per Mg). Petroleum liquids are typically stored in tanks larger than 200,000 gallons, for which the standards will lead to savings rather than additional costs. Taking these factors into account, it is reasonable to control all tanks at least 40,000 gallons in size storing liquids with vapor pressures of at least 0.5 psia.

The Agency then examined the cost effectiveness of requiring controls at vapor pressures lower than 0.5 psia. The cost effectiveness of requiring controls on an individual vessel with a volume of 40,000 gallons storing a liquid with a vapor pressure of 0.25 psia is about $3,000 per Mg. This was judged to be unreasonable, and as a result the Agency decided that controls would not be required at vapor pressures less than 0.5 kPa.

Next, the cost effectiveness of lowering the volume cutoff from the tentative value of 40,000 gallons while holding the vapor pressure constant at 0.5 psia was examined. The cost effectiveness of controlling an individual vessel with a volume of 20,000 gallons storing a liquid with a true vapor pressure of 0.5 psia is about $3,200 per Mg. This was judged unreasonable, and therefore, it was decided not to require controls at volumes less than 40,000 gallons for vessels storing liquids with vapor pressures less than 0.5 psia. Thus, the volume and vapor pressure levels of 40,000 gallons (151 m^3) and 0.5 psia (3.5 kPa), respectively were selected as one component of the final volume vapor pressure cutoffs.

The preceding analysis did not address the possibility of controlling emissions from small vessels (20,000 gallons) that store gasoline or other highly volatile liquids. A 20,000 gallon uncontrolled fixed roof tank storing gasoline may have twice the uncontrolled emissions of a 40,000 gallon tank storing a liquid with a true vapor pressure of 0.5 psia, and the emission reduction obtained by BDT may also be twice as great. Gasoline has a vapor pressure of about 4 psia or greater depending on grade and storage temperature. The cost effectiveness of equipping a 20,000 gallon tank storing a 4.0 psia liquid is about $140 per Mg.

Selecting this cutoff would reduce emissions from small vessels storing gasoline and other highly volatile liquids at a cost effectiveness that is judged to be reasonable. However, there is very little known about vessels between 20,000 and 40,000 gallons storing liquids with vapor pressures less than 4.0 psia. The Agency would have to have more information concerning the location of these vessels and the liquids being stored before a cutoff less than 4.0 psia could be established. Consequently, storage vessels of a size 40,000 gallons or greater and storing liquids with a vapor pressure of 0.5 psia or greater are required to comply with the proposed standards. Also, storage vessels of a size 20,000 gallons or greater and storing a liquid with a vapor pressure of 4.0 psia or greater are required to comply with the proposed standards.

Modification/Reconstruction Considerations

As specified in section 111 of the Clean Air Act (CAA), standards of performance affect not only those facilities constructed after the date of proposal but also facilities that have been modified or reconstructed after the date of proposal. This section describes the conditions under which an existing facility becomes subject to the standards of performance.

"Modification" is defined in section 111(a)(4) of the CAA as "any physical change in, or change in the operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted." Few, if any, changes in the physical configuration of the storage vessels that would increase emissions are anticipated. An operational change that would increase emissions is a changing of the stored liquid from a VOC non-emitting liquid to a VOC emitting liquid.

Section 60.14(e) of the General Provisions to Part 60 lists several changes that are not considered modifications. Among these is the use of a raw material, if prior to the date of proposal of the standard, the existing facility was designed to accommodate that alternative use. This exemption applies to changing of liquids in storage vessels. A change of liquids, therefore, does not constitute a modification. Thus, few, if any modifications of storage vessels are expected.

Under the reconstruction provisions (40 CFR 60.15), an existing facility may become an affected facility if the fixed capital cost of new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable, entirely new facility. It is expected that only under catastrophic circumstances (e.g., total destruction of the storage vessel by fire or explosion, catastrophic collapse of a fixed roof, or collapse of an external floating roof) would a facility become subject to the reconstruction provisions.

Selection of Inspection, Reporting, and Recordkeeping Requirements

Section 111(h) of the Clean Air Act states that if the Administrator prescribes an equipment standard for the control of an air pollutant, he shall "include as part of such standard such requirements as will assure the proper operation and maintenance of any element of . . . equipment." For clarity, the inspection, reporting, and recordkeeping requirements will be discussed for each type of BDT controls in sequence.

Internal Floating Roof Vessels

After the vessel is filled, it will be impossible to accurately ascertain the condition of the primary seal. Additionally, most repairs cannot be performed on an internal floating roof that is in service. Therefore, the proposed standards would require that the owner or operator inspect and report the condition of the internal floating roof, seals, and other required equipment before placing the storage vessel in service. During this initial internal inspection, the owner or operator would inspect for defects on the internal floating roof and for holes, tears, or other openings in the primary seal or seal fabric, including the envelope (if any). Because the condition of seal gaps when the roof is resting on supports is not necessarily predictive of the seal gaps when the roof is floating, no initial seal gap measurement is required for the seals on internal floating roof vessels.

The report containing the results of the initial inspection would also specify the exact type of controls used, including seal type, and gasketing material, as well as certifying that internal floating roof, seal system and fittings meet the specifications of BDT and are free of defects.

Because internal floating roofs and seals can fail, resulting in an increase in emissions, it was decided to require that each storage vessel be inspected periodically and that any failures be repaired.

Control equipment failures such as the sinking or hanging up of an internal floating roof, detachment of the seal from the deck (in whole or in part), holes in the seal fabric or envelope, and no liquid in a liquid-filled seal, are major failures of the control equipment that would be visible during a visual inspection of the seal from the fixed roof, and inspection for these is required. Visual inspection from the fixed roof is not time consuming (estimated to be less than 1 labor hour per inspection, including preparation, in a typical case).

Seal gap measurements are an excellent measure of the ability of the seal system to reduce emissions from the annular space between the internal floating roof and the vessel wall. However, it is hazardous to enter internal floating roof vessels while they are in service, and the vessel would have to be entered to measure seal gaps. Additionally, unlike external floating roofs, many internal floating roofs are not completely rigid structures. Thus, the placement of workers on the deck to measure the gaps may change the gaps that would be measured. On this basis, the Administrator decided not to require periodic gap measurements for internal floating roof vessels.

In considering the frequency at which roof sinkings and hang-ups, seal detachment, and holes or tears in the seal fabric should be inspected, the Administrator balanced the frequency of failures (low), against the cost of visual inspection (small) and the potential benefit obtained by detecting and repairing the failure (varying). Industry experience indicates that the expected frequency of major failures would be measured in years rather than months. Consequently, inspections as frequently as quarterly would be unnecessarily frequent for detection of major failures. Since it is necessary to detect only major failures during the visual inspection and since these occur infrequently, visual inspections are, therefore, required on an annual basis.

If during the annual visual inspection, the owner or operator finds that the floating roof has sunk; that liquid has accumulated on the floating roof; that there are holes or tears in the seal; that the seal is detached; or that the seal is no longer operating as designed (e.g., liquid-filled seal has no liquid); these failures would have to be repaired. In order to repair these failures, any liquid in the storage vessel may have to be removed, and the storage vessel must be degassed. Once this is completed, there would be no additional emissions due to control equipment failure. For this reason, there is no rationale for a limit on the length of time allowed for repairing control equipment failures. However, it is reasonable to place a time constraint on the length of time liquid would be allowed to remain in the unrepaired storage vessel. The Administrator considered requiring that the liquid be removed immediately after a failure is detected. However, not all facilities could be expected to have extra storage capacity for the displaced liquid. A survey of facilities indicated that most facilities could empty a storage vessel having equipment in need of repair within 30 days. As a result, the Administrator determined that if a failure is detected during an annual visual inspection, it is reasonable to require that the owner or operator of a storage vessel repair the failed equipment or empty the storage vessel within 30 days. Consequently, this is a requirement in the proposed standards.

Records of each inspection would be kept. These recordkeeping provisions are not burdensome (less than 1 labor-hour per vessel per year) and are an important method of determining compliance with the proposed standards. Each such record would identify the vessel, contain the date the vessel was inspected and the results of the inspection. No periodic reporting of annual inspections is required.

However, if a failure is detected, a report is required. The report would have to identify the storage vessel that did not meet the requirements of the proposed standards and the reasons it did not fulfill the requirements. In addition, the report would have to describe the steps necessary to bring the storage vessel into compliance with the proposed standards. An extension of the 30-day repair or refill requirement may be requested from the Administrator in a report demonstrating that alternate storage capacity is unavailable and specifying a schedule that assures that the control equipment will be repaired or the vessel will be emptied as soon as possible.

Some failures of the seal system may not be detectable during the visual inspection from the fixed roof. Holes and tears are most likely to develop on the portions of the seal not visible from the fixed roof. Additionally, visibility is limited by lighting and distance problems during the inspection from the fixed roof. Because an internal inspection may detect failures that would otherwise go undetected, there are advantages to requiring that the vessel be emptied and degassed, and an internal inspection of the controls be performed. Inspection of the control equipment from both the underside and topside of the internal floating roof can be performed when the vessel is emptied and degassed.

The EPA then examined the frequency at which inspections should be required. The controls required on fixed roof vessels have a very low failure rate and are expected to last many years when installed properly. Data indicate that vessels are generally degassed on the average of once every 10 years for inspection as a typical practice. Therefore, if owners or operators were required to perform internal inspections on their vessels at least once every 10 years, this requirement would, on the average, cause no additional degassings of the vessel, and hence no additional emissions. Consequently, since there are advantages to performing internal inspections on an internal floating roof storage vessel and since they are inspected routinely on the average of every 10 years, the proposed standards require an internal inspection of each internal floating roof storage vessel at least once every 10 years. If a vessel is emptied and degassed to repair a failure detected by an annual visual inspection, an internal inspection must be performed. This inspection will be substituted for the 10-year inspection, and another internal inspection will not be required for another 10 years. This requirement will result in one degassing where two would have occurred otherwise.

To afford the Administrator the opportunity to have an observer present to ascertain the condition of the control equipment before the vessel is refilled with VOL, the proposed standards require that the owner or operator submit written notification of the data of refill 30 days in advance. This is reasonable when the internal inspection takes place as scheduled in the tenth year.

However, there are instances in which the internal inspection may take place early. An unplanned plant shutdown or other event may provide the owner or operator a convenient time to inspect, and if necessary repair. To require that the vessel remain empty for possibly 30 days prior to refill in these situations may deter owners and operators from inspecting the control equipment. This is because in many cases, requiring the vessel to remain empty may require that the plant be shutdown for the 30 days. The costs of this would be so punitive as that owners or operators would elect not to empty and degas.

However, the inspection and repair of control equipment whenever possible is desirable. To alleviate the burden of the 30-day notice of refill in those unscheduled cases, the proposed standards allow for a shorter notification period. If the internal inspection is performed prior to the tenth year, the owner and operator shall notify the Administrator at least 7 days prior to refill. Notification shall be made by telephone followed by written documentation demonstrating why 30 days notice could not have been given. Alternatively, this notification, including the written documentation may be made in writing and sent by express mail.

The EPA feels that this 7 day period will not be punitive since it generally takes 7 to 10 days to prepare the vessel for the refill inspection; i.e., empty, vent, clean, inspect, and repair. However, the EPA requests comments on the 7 day period; are there particular circumstances under which the 7 day period may cause hardship in the industry, and what is the frequency of such circumstances.

The results of each internal inspection shall be recorded. The record shall identify the storage vessel, the date the inspection was performed, the condition of the control equipment (deck, seal, gaskets), list any repairs made to the control equipment and certify that the control equipment met the specifications of BDT prior to refilling the vessel with VOL. No periodic reporting of the internal inspection is necessary.

However, if a control equipment failure is detected, a report is required. The report would identify the storage vessel that did not meet the requirements of the proposed standards and the reasons it did not fulfill the requirements. In addition, the report would have to describe the steps necessary to bring the vessel into compliance with the proposed standards.

External Floating Roof Vessels

The seal system of an external floating roof vessel may fail, and gaps may develop between the primary or secondary seal and the vessel wall. The primary seal (in particular the underside) will not be visible once the vessel is placed in service. Therefore, to ensure that the seals are in good operating condition, the proposed standards require the owner or operator to initially inspect the controls (seal system) prior to placing the vessel in service.

During this initial internal inspection, the owner or operator would inspect for holes, tears, or other openings in the primary seal or seal fabric including the envelop (if any) and holes, tears, or openings in the secondary seal. Because the condition of seal gaps when the roof is resting on supports is not necessarily predictive of the seal gaps when the roof is floting, no seal gap measurement is required prior to placing the vessel in service.

The results of the initial inspection will be submitted to the Administrator in a report, along with a description of the exact type of controls, including seal type, as well as a certification that the seal system is free of defects.

As stated previously, seal gap measurements are an excellent measure of the performance of the seal system. Thus, seal gap measurements constitute a "performance test" that will ensure that the seals are operating properly. Such measurements are required by the current NSPS for petroleum liquid storage vessels (Subpart Ka), and they have been adopted in this revision. The owner or operator would be required to measure the gaps in both the primary and secondary seals within 60 days of introducing VOL into the storage vessel and would be required to submit the results in a written report to the Administrator.

Gaps in the seals may develop over time as the seal system is exposed to the elements and abrades against the vessel wall. An examination of the available data shows that 98 percent of the liquid-mounted primary seals and 96 percent of the mechanical shoe primary seals would be expected to be within the gap limitations allowed by these proposed standards. Also, some gap measurement techniques require that the secondary seal be pulled back during the measurement process, resulting in increased emissions during the measurement. In evaluating the frequency with which these measurements should be performed, the Agency balance the expected low incidence of failures against the possible increases in emissions and concluded that the 5-year interval between primary seal gap measurements required by Subpart Ka is sufficient to detect those failures that do occur. Therefore, the Administrator selected 5 years as the frequency of measurements for primary seal gaps.

Secondary seals can also develop gaps, which will increase emissions. from the seal area. The available data show that about 95 percent of the secondary seal would be within the gap limitation specified by these proposed standards. While the failure rate of secondary seals is expected to be similar to primary seals, there is free access to the secondary seal, and the measurement of secondary seal gaps would not result in increased emissions during the measurement process. Also, the presence of an adequately functioning secondary seal is fundamental in reducing seal emissions. Therefore, it was concluded that secondary seal measurements should be made more frequently than primary seal gap measurements. The selected interval, once per year, is based on the free access to the seal and its importance as a control device. In the event that the measured gaps exceed the specified limitations, the owner or operator must repair the secondary seal so that it conforms to the specified gap limitations.

While typically it will not be necessary to empty the storage vessel to make repairs, in some cases it may be necessary to do so. The Administrator decided that the allowable period of repair (or emptying) should be the same as that for internal floating roof vessels, i.e., 30 days. As with internal floating roof vessels, an extension of the 30 day repair or refill requirement may be requested.

Subpart Ka currently requires the owner or operator to submit a report within 60 days of performing each gap measurement. The Agency has determined that if the measured gaps in the primary or seconary seal do not exceed the specified limitations, a record of the measurement is sufficient and that reports are unnecessary. Therefore, these proposed standards, and the proposed amendment to Subpart Ka, require only records for each gap measurement be kept by the owner or operator. Each record shall contain the date of measurement, the raw data obtained in the measurement, and the results.

In the event the measured gaps exceed those specified, a report would be required. The report would have to identify each storage vessel that did not meet the requirements of the proposed standards and the reason it did not fulfill the requirements. In addition, the report would have to describe the steps necessary to bring the storage vessel into compliance with the proposed standards.

In the event it is necessary to empy and degas the vessel to effect repairs, the owner or operator must provide 30 days notice to the Administrator prior to refill. Again, as with internal floating roof vessels, the owner or operator must provide 7 days notice prior to refill. Notification shall be made by telephone followed by written documentation demonstrating why 30 days notice could not have been given. Alternatively, this notification, including the written documentation may be made in writing and sent by express mail.

Closed Vent Systems and Control Devices

To enable the EPA to determine compliance with the requirements for the closed vent system and control device, the proposed standards require the owner or operator to submit plans and specifications for the system to the EPA as an attachment to the notification required by § 60.7(a)(1). If the facility is exempt from § 60.7(a)(1), the submittal shall be made as an attachment to the notification required by § 60.7(a)(2).

Engineering design calculations on the efficiency of the closed vent system and control device are to be included in the submittal. The design information would contain documentation demonstrating that the control device being used achieves the required control efficiency during reasonably expected maximum loading conditions. This documentation is to include a description of the gas stream that enters the control device, including flow and vapor content under varying liquid level conditions (dynamic and static), and the manufacturer's design specifications for the control device. If the control device or the closed vent capture system receives vapors, gases or liquids, other than fuels, from sources that are not designated sources under this subpart, the efficiency demonstration is to include consideration of all vapors, gases and liquids received by the closed vent capture system and control device.

Closed vent systems and vapor control devices are also subject to failures or improper operations and, therefore, require periodic inspection. Examples of failures or improper operation include insufficient combustion temperature in the thermal oxidation unit, allowing a carbon bed to become saturated with organics prior to desorbing and compressor failures. Many, but not all, failures can be detected by regular inspection of operational parameters. Therefore, the proposed standards would require the owner or operator to submit, along with the design specifications of the closed vent system and control device, an operating plan. The operating plan would contain a description of the parameter or parameters to be monitored to ensure that the control device is operated in conformance with its design and an explanation of the criteria used for selection of that parameter (or parameters). The owner or operator would be required to operate and monitor the parameters of the closed vent system and control device in accordance with the operating plan. The Administrator will review and approve or disapprove the parameters to be monitored. Because of the wide variation in types of systems, the following discussion on the information to be submitted should be considered general guidance except where otherwise noted.

For thermal oxidizers the design information should include the autoignition temperature of the VOC vapors, the combustion temperature, residence time at the combustion temperature and flow rate. To ensure proper operation, components such as compressors or blowers should be routinely inspected, and the combustion temperature should be routinely monitored.

The specifications that will allow two types of thermal oxidation devices to reduce VOC vapors by 98 percent, and would therefore meet the 95 percent requirement of these standards, are known. Recent tests have demonstrated smokeless steam-assisted, air-assisted and nonassisted flares can achieve 98 percent control over a broad range of vapor types if the heat content of the flared gas was maintained above 7.45 MJ/scm (200 Btu/scf) or 11.2 MJ/scm (300 Btu/scf) (depending upon flare design), and the exit velocity of the flare is less than 18 m/sec. Monitoring provisions for flares are provided in the regulation. An enclosed combustion device with a minimum residence time of 0.75 seconds and a minimum temperature of 816°C will also provide 98 percent control. Documentation that these conditions exist is sufficient to meet the requirements of these standards.

Design information submitted for carbon adsorbers could include the affinity of the VOC vapors for carbon, the amount of carbon in each bed, the number of beds, the humidity of the feed gases, the temperature of the feed gases, and flow rate. Operating information should include desorption schedule, steam pressure or temperature, and the amount of steam used (for vacuum desorption pressure drop should be included). Components such as blowers should be routinely inspected.

Design information for condensers should include the final temperature of the VOC vapors, type of condenser and flow rate. To ensure proper operation, items such as compressors and pumps could be inspected on a routine basis, and temperature and refrigerant (if any) levels should also be monitored.

It is possible that the information required to be reported by this NSPS could also be required by regulations of Superfund. In such a situation, the report required by the Superfund regulations could be substituted for the report or reports required by this NSPS.

Selection of Monitoring of Operations Requirements

Without information on the capacity of the storage vessel, there is no way to determine whether the vessel may be subject to the controls required by these proposed standards. Therefore, the proposed standards require that the owner or operator of each storage vessel with a capacity greater than or equal to 40 m^3 keep a record of the height, diameter, and capacity of each such vessel. These records may consist of purchase orders or other information that is routinely kept.

Without information on the maximum vapor pressure of the stored liquid, there is no way to determine whether a storage vessel with a capacity greater than 75 m^3 is subject to the controls required by these proposed standards. To determine applicability of these proposed standards, the owner or operator would be required to maintain a record of the liquid stored, the period of storage, and the maximum true vapor pressure of the liquid during the respective period of storage. If an owner or operator routinely keeps such records, no special record need be kept for the purposes of the proposed standards.

Because true vapor pressure of the stored liquid is a function of storage temperature, it is expected that if applicability of these standards were based on the instantaneous true vapor pressure of the stored liquid, some vessels could be unaffected during the cooler seasons but could be affected during the summer months or during short excursions from normal operating temperatures, while other liquids could remain unaffected year round.

Facilities that are affected only under unusual conditions could cause industry difficulties in planning inspections and in determining applicability. It was decided, therefore, to base applicability on the maximum true vapor pressure of the stored liquid. It was further decided that the maximum true vapor pressure should be calculated (a) for vessels operated at controlled temperatures that differ from ambient temperatures, using the highest expected calendar-month average of the storage temperature, and (b) for vessels operated at ambient temperatures, using the local maximum monthly average ambient temperature as reported by the National Weather Service.

Because temperature variations or process changes result in vapor pressure changes of the stored liquid, it was decided that the owner or operator of each affected facility should keep a record of the maximum true vapor pressure at some point less than the point at which controls are required: 3.5 kPa for capacities greater than or equal to 151 m^3 and 27.6 kPa for capacities greater than or equal to 75 m^3 but less than 151 m^3. These vapor pressures should be high enough so that records would not be kept on liquids that could not, under reasonable circumstances, reach the maximum true vapor pressure cutoffs, but low enough so that records would be kept on most liquids that could reach the maximum true vapor pressure cutoffs. After consideration, it was decided that recordkeeping would be required for liquids with a maximum true vapor pressure than or equal to 1.75 kPa for capacities greater than or equal to 151 m^3 and 15.0 kPa for capacities greater than or equal to 75 m^3 but less than 151 m^3.

In developing the reporting requirements in the proposed standards, consideration was given to including this information in annual reports. It was decided that the inclusion of this information would be unnecessarily burdensome. Therefore, the proposed standards would not require the owner or operator to report on vapor pressure but would require the owner or operator to maintain a record of the maximum true vapor pressure for any liquid with a vapor pressure greater than or equal to 1.75 kPa (for capacities greater than or equal to 151 m^3) and 15.0 kPa (for capacities greater than or equal to 75 m^3 but less than 151 m^3). For vessels containing liquids that are normally maintained below 3.5 kPa or 27.6 kPa for the respective capacity ranges, a notification to the Administrator is required when the maximum true vapor pressure exceeds 3.5 kPa or 27.6 kPa, respectively. For refined petroleum products the vapor pressure may be obtained from procedures specified in API Bulletin 2517. For other compounds the vapor pressure may be obtained from standard texts or measured as described in ASTM Method D-2879-75. The owner or operator also would be allowed to use other appropriate means to make the determination as approved by the Administrator. Comment is invited on the method of vapor pressure calculation and the point at which records shall be kept.

Impacts of Reporting Requirements

The Paperwork Reduction Act (PRA) of 1980 (Pub. L. 96-511) requires that the Office of Management and Budget (OMB) approve reporting and recordkeeping requirements that qualify as an "information collection request" (ICR). The EPA also uses 2-year periods in its impact analysis procedures for estimating the labor-hour burden of reporting and recordkeeping requirements.

During the first 2 years that the proposed standards would be in effect, the average annual industry-wide burden of the reporting and recordkeeping requirements associated with the proposed standards would be 26,100 person-hours, based on an average of 1,250 respondents per year.

Public Hearing

A public hearing will be held, if requested, to discuss the proposed standards in accordance with section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations should contact the EPA at the address given in the **ADDRESSES** section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement with the EPA before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the **ADDRESSES** section in this preamble.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at the EPA's Central Docket Section, in Washington, D.C. (See **ADDRESSES** section of this preamble.)

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered in the development of this proposed rulemaking. The principal purposes of the docket are (1) to allow interested parties to readily identify and locate documents so that they can effectively participate in the rulemaking process and (2) to serve as the record in case of judicial review, excluding interagency review materials [section 307(d)(7)(A)].

Miscellaneous

As prescribed by Section 111, establishment of standards of performance for volatile organic liquid storage vessels are preceded by the Administrator's determination that VOC emissions from the synthetic organic chemical manufacturing industry and volatile organic liquid storage vessels contribute significantly to air pollution which may be reasonably anticipated to endanger public health or welfare. In accordance with section 117 of the Act, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed regulations, including the technological issues and the inspection program.

This regulation will be reviewed 4 years from the date of promulgation as required by the Clean Air Act. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, improvements in emission control technology, and reporting requirements.

The information provisions associated with this proposed rule (§§ 60.7, 60.8, 60.114(b), and 60.115(b)) will be submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1980 U.S.C. 3501 *et seq.* Comments on these requirements should be submitted to the Office of Information and Regulatory Affairs of OMB—marked Attention: Desk Officer for EPA. The final rule package will respond to any OMB or public comments on the information collection provisions.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for any new source standard of performance promulgated under section 111(b) of the Act. An economic impact assessment was prepared for the proposed regulations and for other regulatory alternatives. All aspects of the assessment are considered in the formulation of the proposed standards to ensure that the proposed standards would represent the best system of emission reduction considering costs. The economic impact assessment is included in the background information document.

Under Executive Order 12291, the EPA must judge whether a regulation is "major" and therefore subject to the requirement of a Regulatory Impact Analysis. The Agency has determined that this regulation would result in none of the adverse economic effects set forth in Section 1 of the Order as grounds for finding a regulation to be a "major rule." Because the recommended control equipment results in the retention of affected liquids that would otherwise be lost, the net annualized cost through the first 5 years of implementation including depreciation and interest, is projected to be a credit or savings rather than a cost. [These costs (savings) do not include lost opportunity costs (i.e., the profit or return on investment that would be derived by investing in other than air pollution control equipment)]. No increase in the price of VOC emitting liquids attributable to implementation of these proposed standards is expected. The Agency has therefore concluded that this regulation is not a "major rule" under Executive Order 12291.

This regulation was submitted to the Office of Management and Budget (OMB) for review as required by Executive Order 12291. Any comments from the OMB to the EPA and the EPA response to those comments are included in Docket Number A–80–51. The docket is available for public inspection of the EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460.

Regulatory Flexibility Analysis Certification

Pursuant to the provisions of 5 U.S.C. 605(b), I hereby certify that this rule, if promulgated, will not have a significant economic impact on a substantial number of small business entities because, in general, small businesses do not own the type of facility affected by these proposed standards. The maximum capital and annualized costs likely to be experienced by a small business are estimated to be $6,300 and $500 per affected facility, respectively. If a small business did own an affected facility, it is unlikely that any adverse economic impacts would occur as a result of these regulations because both the capital and annualized costs are small.

List of Subjects in 40 CFR Part 60

Air pollution control, Aluminum, Ammonium sulfate plants, Asphalt, Cement industry, Coal copper, Electric power plants, Glass and glass products, Grains, Intergovernmental relations, Iron, Lead, Metals, Metallic minerals, Motor vehicles, Nitric acid plants, Paper and paper products industry, Petroleum, Phosphate, Sewage disposal, Steel, Sulfuric acid plants, Waste treatment and disposal, Zinc, Tires, Incorporation by reference, Can surface coating, Sulfuric acid plants, Industrial organic chemicals, Organic solvent cleaners, Fossil fuel-fired steam generators, Fiberglass insulation, Synthetic fibers.

(42 U.S.C. 7411, Clean Air Act 111)

Dated: July 10, 1984.

William D. Ruckelshaus,
Administrator.

PART 60—[AMENDED]

For the reasons set out in the preamble, it is proposed that 40 CFR Part 60 be amended as set forth below.

1. Section 60.16 of Subpart A is amended by revising the first entry in the list to read as follows:

§ 60.16 Priority list.

1. Synthetic Organic Chemical Manufacturing Industry (SOCMI) and Volatile Organic Liquid Storage Vessels and Handling Equipment

(a) SOCMI unit processes

(b) Volatile organic liquid (VOL) storage vessels and handling equipment

(c) SOCMI fugitive sources

(d) SOCMI secondary sources

* * * * *

2. Section 60.17 of Subpart A is amended by revising paragraph (a)(13), adding paragraph (a)(41), and revising paragraph (c)(1) as follows:

§ 60.17 Incorporation by reference.

(a) * * *

(13) ASTM–D–323–82, Test Method for Vapor Pressure of Petroleum Products (Reid Method), for §§ 60.111(1), 60.111a(g), and 60.111b(f).

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(41) ASTM–2879–75, Test Method for Vapor Pressure—Temperature Relationship and Initial Decomposition Temperature by Isoteniscope, for §§ 60.111b(e)(3) and 60.116b(e)(ii).

* * * * *

(c) * * *

(1) API Publication 2517, Evaporation Loss from External Floating Roof Tanks, Second Edition, February 1980, for §§ 60.111(i), 60.111a(f), 60.111b(e)(1) and 60.116b(e)(i).

* * * * *

3. The heading for Subpart K is revised to read as follows:

Subpart K—Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973 and Prior to May 19, 1978

4. The heading for Subpart Ka is revised to read as follows:

Subpart Ka—Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984

5. In § 60.113a of Subpart Ka, the introductory text of (a)(1)(i) is revised and (a)(1)(i) (D) and (E) are added to read as follows:

§ 60.113a Testing and Procedures.

(a) * * *

(1) * * *

(i) Determine the gap areas and maximum gap widths between the primary seal and the tank wall, and the secondary seal and the tank wall according to the following frequency:

* * * * *

(D) Keep records of each gap measurement at the plant for a period of at least 2 years following the date of measurement. Each record shall identify the vessel on which the measurement was performed, and shall contain the date of the seal gap measurement, the raw data obtained in the measurement process required by paragraph (a)(1)(ii) of this section and the calculation required by paragraph (a)(1)(iii) of this section.

(E) If either the results of each seal gap calculated in paragraph (a)(1)(iii) of this section or each measured maximum seal gap; exceed the limitations specified by § 60.112a of this subpart, a report shall be furnished to the Administrator within 60 days of the date of measurements. The report shall identify the vessel and list each reason why the vessel did not meet the specifications of § 60.112a. The report shall also describe the actions necessary to bring the storage vessel into compliance with the specifications of § 60.112a.

* * * * *

6. Add Subpart Kb as follows:

Subpart Kb—Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984

Authority: Secs. 111, 114, and 301(a) of the Clean Air Act, as amended (42 U.S.C. 7411, 7414, and 7601(a)), and additional authority as noted below.

Subpart Kb—Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984

§ 60.110b Applicability and designation of affected facility.

(a) Except as provided below, the affected facility to which this subpart applies is each storage vessel with a capacity greater than or equal to 40 cubic meters (m^3) that is used to store volatile organic liquids (VOL's) for which construction, reconstruction, or modifications is commenced after July 23, 1984.

(b) Except for paragraphs (a) and (b) of § 60.116b, storage vessels with design capacity less than 75 m^3 are exempt from the provisions of this subpart.

(c) Except for paragraph (b) in § 60.116b, vessels either with a capacity greater than or equal to 151 m^3 storing a liquid with a maximum true vapor pressure less than 1.75 kPa or with a capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure less than 15.0 kPa are exempt from the provisions of this subpart.

(d) This subpart does not apply to the following:

(1) Vessels at coke oven by-product plants.

(2) Pressure vessels designed to operate in excess of 204.9 kPa and without emissions to the atmosphere.

(3) Vessels permanently attached to mobile vehicles such as trucks, railcars, barges, or ships.

(4) Vessels with a design capacity less than or equal to 1,589.874 m^3 used for petroleum or condensate stored, processed, or treated prior to custody transfer.

(5) Vessels located at bulk gasoline plants controlled by a vapor balance system.

§ 60.111b Definitions.

Terms used in this subpart are defined in the Act, in Subpart A of this part, or in this subpart as follows:

(a) "Bulk gasoline plant" means any gasoline distribution facility which has a gasoline throughput less than or equal to 75,700 liters per day. Gasoline throughput shall be the maximum calculated design throughput as may be limited by compliance with an enforceable condition under Federal, State or local law, and discoverable by the Administrator and any other person.

(b) "Condensate" means hydrocarbon liquid separated from natural gas which condenses due to changes in the temperature or pressure, or both, and remains liquid at standard conditions.

(c) "Custody transfer" means the transfer of produced petroleum and/or condensate, after processing and/or treating in the producing operations, from storage vessels or automatic transfer facilities to pipelines or any other forms of transportation.

(d) "Fill" means the introduction of VOL into a storage vessel but not necessarily to complete capacity.

(e) "Maximum true vapor pressure" means the equilibrium partial pressure exerted by the stored liquid at the greatest expected calendar-month average of the liquid storage temperature for liquids stored above or below the ambient temperature or at the local maximum monthly average temperature as reported by the National Weather Service for liquids stored at the ambient temperature, as determined:

(1) In accordance with methods described in American Petroleum Institute Bulletin 2517, Evaporation Loss from External Floating Roof Tanks (incorporated by reference—see § 60.17); or

(2) As obtained from standard reference texts; or

(3) As determined by ASTM Method D-2879-75 (incorporated by reference—see § 60.17);

(4) Any other method approved by the Administrator.

(f) "Reid vapor pressure" means the absolute vapor pressure of volatile crude oil and nonvolatile non-viscous petroleum liquids except liquified petroleum gases, as determined by ASTM-D-323-82 (incorporated by reference—see § 60.17).

(g) "Petroleum" means the crude oil removed from the earth and the oils derived from tar sands, shale, and coal.

(h) "Storage vessel" means each tank, reservoir, or container used for the storage of volatile organic liquids but does not include:

(1) Frames, housing, auxiliary supports, or other components that are not directly involved in the containment of liquids or vapors; or

(2) Subsurface caverns or porous rock reservoirs.

(i) "Vapor balance system" means a VOC vapor control system which returns vapors displaced from a receiving vessel to the vessel being unloaded such that:

(1) Hatches are not to be opened at any time during loading operations;

(2) There are no leaks in pressure vacuum relief valves and hatch covers, nor in either vessel, nor in associated vapor return lines during loading or unloading operations; and

(3) Pressure relief valves on vessels are to be set to release at the highest possible pressure consistent with State or local fire codes or the National Fire Prevention Association guidelines.

(j) "Volatile organic liquid (VOL)" means any organic liquid which can emit volatile organic compounds into the atmosphere.

§ 60.112b Standard for volatile organic compounds (VOC).

(a) The owner or operator of each storage vessel either with a design capacity greater than or equal to 151 m^3 containing a VOL that, as stored, has a maximum true vapor pressure equal to or greater than 3.5 kPa but less than 76.6 kPa or with a design capacity greater than or equal to 75 m^3 but less than 151 m^3 containing a VOL that, as stored, has a maximum true vapor pressure equal to or greater than 27.6 kPa but less than 76.6 kPa, shall equip each storage vessel with one of the following:

(1) A fixed roof in combination with an internal floating roof meeting the following specifications:

(i) The internal floating roof shall rest or float on the liquid surface (but not necessarily in complete contact with it) inside a storage vessel that has a fixed roof. The internal floating roof shall be floating on the liquid surface at all times, except during initial fill and during those intervals when the storage vessel is completely emptied or subsequently emptied and refilled. When the roof is resting on the leg supports, the process of filling, emptying, and refilling shall be continuous and shall be accomplished as rapidly as possible.

(ii) Each internal floating roof shall be equipped with one of the following closure devices between the wall of the storage vessel and the edge of the internal floating roof:

(A) A foam- or liquid-filled seal mounted in contact with the liquid (liquid-mounted seal), or

(B) Two seals mounted one above the other so that each forms a continuous closure that completely covers the space between the wall of the storage vessel and the edge of the internal floating roof; the lower seal may be vapor-mounted, but both must be continuous, or

(C) A mechanical shoe seal.

(iii) Each opening in the internal floating roof except for automatic bleeder vents and the rim space vents is to provide a projection below the liquid surface.

(iv) Each opening in the internal floating roof except for column wells, automatic bleeder vents, rim space vents, and stub drains is to be equipped with a cover or lid which is to be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use. The cover or lid shall be equipped with a gasket. Covers on each access hatch and automatic gauge float well shall be bolted except when they are in use.

(v) Automatic bleeder vents shall be equipped with a gasket and are to be closed at all times except when the internal floating roof is floating.

(vi) Rim space vents shall be equipped with a gasket and are to be set to open only when the internal floating roof is not floating or at the manufacturer's recommended setting.

(vii) Each penetration of the internal floating roof for the purpose of sampling shall be a sample well. The sample well shall have a slit fabric cover that covers at least 90 percent of the opening.

(viii) Each penetration of the internal floating roof that allows for passage of a column supporting the fixed roof shall have a flexible fabric sleeve seal.

(2) An external floating roof. An external floating roof means a pontoon-type or double-deck type cover that rests on the liquid surface in a vessel with no fixed roof. Each external floating roof must meet the following specifications:

(i) Each external floating roof shall be equipped with a closure device between the wall of the storage vessel and the roof edge. The closure device is to consist of two seals, one above the other. The lower seal is referred to as the primary seal and the upper seal is referred to as the secondary seal.

(A) The primary seal shall be either a metallic shoe seal or a liquid-mounted seal. A liquid-mounted seal means a form or liquid-filled seal mounted in contact with the liquid between the wall of the storage vessel and the floating roof continously around the circumference of the tank. Except as provided in § 60.113b(b)(4) the seal shall completely cover the space between the floating roof and tank wall. A metallic shoe seal is a metal sheet held vertically against the wall of the storage vessel except as provided in § 60.113(b)(4) by springs or weighted levers and is connected by braces to the floating roof. A flexible coated fabric (envelope) spans the annular space between the metal sheet and the floating roof.

(B) The secondary seal shall completely cover the annular space between the external floating roof and the wall of the storage vessel in a continuous fashion except as allowed in § 60.113b(b)(4).

(ii) Except for automatic bleeder vents and rim space vents, each opening in the roof shall provide a projection below the liquid surface. Except for automatic bleeder vents, rim space vents, and leg sleeves, each opening in the roof is to be equipped with a gasketed cover, seal or lid which is to be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use. Automatic bleeder vents are to be closed at all times when the roof is floating, except when the roof is being floated off or is being landed on the roof leg supports. Rim vents are to be set to open when the roof is being floated off the roof legs supports or at the manufacturer's recommended setting. Automatic bleeder vents and rim space vents are to be gasketed. Each emergency roof drain is to be provided with a slotted membrane fabric cover that covers at least 90 percent of the area of the opening.

(iii) The roof shall be floating on the liquid at all times (i.e., off the roof leg supports) except during initial fill until the roof is lifted off leg supports and when the tank is completely emptied and subsequently refilled. The process of emptying and refilling when the roof is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible.

(3) A closed vent system and control device meeting the following specifications:

(i) The closed vent system shall be designed to collect all VOC vapors and gases discharged from the storage vessel and operated with no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background and visual inspections, as determined in Part 60, Subpart VV, § 60.485(b).

(ii) The control device shall be designed and operated to reduce inlet VOC emissions by 95 percent or greater. If a flare is used as the control device, it shall meet the following specifications:

(A) The flare shall either be steam-assisted, air-assisted or non-assisted and shall be designed and operated with no visible emissions as determined by the methods specified in § 60.113b(d)(1), except for periods not to exceed a total of 5 minutes during any 2 consecutive hours, and shall be operated with a flame present at all times as determined by the methods specified in § 60.113b(d)(2).

(B) Steam-assisted or air-assisted flares shall be used only when the net heating value of the gas to be combusted is 11.2 MJ/scm (300 Btu/scf) or greater. Non-assisted flares shall be used only when the net heating value of the gas to be combusted is 7.45 MJ/scm or greater. The net heating value of the gas being combusted shall be determined by the methods specified in § 60.113b(d)(3).

(C) Steam-assisted and non-assisted flares shall be designed for and operated with an exit velocity of less than 18 m/sec (60 ft/sec) as determined by the methods specified in § 60.113b(d)(4).

(D) Air-assisted flares shall be designed and operated with an exit velocity less than the velocity V_{max}, as determined by the methods specified in § 60.113b(d)(5).

(4) A system equivalent to those described in paragraphs (a)(1), (a)(2), or (a)(3) of this section as provided in § 60.114b of this subpart.

(b) The owner or operator of each storage vessel with a design capacity greater than or equal to 75 m^3 which contains a VOL that, as stored, has a maximum true vapor pressure greater than or equal to 76.6 kPa shall equip each storage vessel with one of the following:

(1) A closed vent system and control device as specified in § 60.112b(a)(3).

(2) A system equivalent to that described in paragraph (b)(1) as provided in § 60.114b of this subpart.

§ 60.113b Testing and procedures.

The owner or operator of each storage vessel as specified in § 60.112b(a) shall meet the requirements of paragraphs (a), (b), or (c) of this section. The applicable paragraph for a particular storage vessel depends on the control equipment installed to meet the requirements of § 60.112b.

(a) After installing the control equipment required to meet § 60.112b(a)(1) (permanently affixed roof and internal floating roof) each owner or operator shall:

(1) Visually inspect the internal floating roof, the primary seal, and the secondary seal (if one is in service), prior to filling the storage vessel with VOL. If there are holes, tears or other openings in the primary seal, the secondary seal, or the seal fabric, or defects in the internal floating roof, or both, the owner or operator shall repair the items before filling the storage vessel.

(2) Visually inspect the internal floating roof and the primary seal or the secondary seal (if one is in service) through manholes and roof hatches on the fixed roof at least once every 12 months after initial fill. If the internal floating roof is not resting on the surface of the VOL inside the storage vessel, or there is liquid accumulated on the roof, or the seal is detached, or there are holes or tears in the seal fabric, the owner or operator shall repair the items or empty and remove the storage vessel from service within 30 days. If a failure that is detected during inspections required in this paragraph cannot be repaired within 30 days and if the vessel cannot be emptied within 30 days, an extension of the 30-day repair or refill requirement of this section may be requested from the Administrator in the inspection report required in § 60.115b(a)(3). Such extension request must include a demonstration of unavailability of alternate storage capacity and a specification of a schedule that will assure that the control equipment will be repaired or the vessel will be emptied as soon as possible.

(3) Visually inspect the internal floating roof, the primary seal, the secondary seal (if one is in service), gaskets, slotted membranes (if any), and sleeve seals (if any) each time the storage vessel is emptied and degassed. If the internal floating roof has defects, the primary seal has holes, tears, or other openings in the seal or the seal fabric, or the secondary seal has holes, tears, or other openings in the seal fabric, or the secondary seal has holes, tears, or other openings in the seal or the seal fabric, or the gaskets no longer close off the liquid surfaces from the atmosphere, or the slotted membrane has more than 10 percent open area, the owner or operator shall repair the items as necessary so that none of the conditions specified in this paragraph exist before refilling the storage vessel with VOL. In no event shall inspections conducted in accordance with this provision occur at intervals greater than 10 years.

(4) Notify the Administrator in writing after performing the inspections required by paragraphs (a)(1) and (a)(3) of this section at least 30 days prior to the filling or refilling of each storage vessel to afford the Administrator the opportunity to inspect the storage vessel prior to refilling. If the inspection required by paragraph (a)(3) of this section is not planned and the owner or operator could not have known about the inspection 30 days in advance of refilling the tank, the owner or operator shall notify the Administrator at least 7 days prior to the refilling of the storage vessel. Notification shall be made by telphone followed by written documentation demonstrating why the inspection was unplanned. Alternatively, this notification, including the written documentation may be made in writing and sent by express mail.

(b) After installing the control equipment required to meet § 60.112b(a)(2) (external floating roof) the owner or operator shall:

(1) Determine the gap areas and maximum gap widths between the primary seal and the wall of the storage vessel, and the secondary seal and the wall of the storage vessel according to the following frequency.

(i) Measurements of gaps between the tank wall and the primary seal (seal gaps) shall be performed within 60 days of the initial fill with VOL and at least once every 5 years thereafter.

(ii) Measurements of gaps between the tank wall and the secondary seal shall be performed within 60 days of the initial fill with VOL and at least once per year thereafter.

(iii) If any source ceases to store VOL for a period of 1 year or more, subsequent introduction of VOL into the vessel shall be considered an initial fill for the purposes of paragraphs (b)(1)(i) and (b)(1)(ii) of this section.

(2) Determine gap widths and areas in the primary and secondary seals individually by the following procedures:

(i) Measure seal gaps, if any, at one or more floating roof levels when the roof is floating off the roof leg supports.

(ii) Measure seal gaps around the entire circumference of the tank in each place where a ⅛" diameter uniform probe passes freely (without forcing or binding against seal) between the seal and the wall of the storage vessel and measure the circumferential distance of each such location.

(iii) The total surface area of each gap described in paragraph (b)(2)(ii) of this section shall be determined by using probes of various widths to measure acurately the actual distance from the tank wall to the seal and multiplying each such width by its respective circumferential distance.

(3) Add the gap surface area of each gap location for the primary seal and the secondary seal individually and divide the sum for each seal by the nominal diameter of the tank and compare each ratio to the respective standards in paragraph (b)(4) of this section.

(4) Make necessary repairs or empty the storage vessel within 30 days of identification in any inspection for seals not meeting the requirements listed in (b)(4) (i) and (ii) of this section:

(i) The accumulated area of gaps between the tank wall and the metallic shoe seal or the liquid-mounted seal shall not exceed 212 cm^2 per meter of tank diameter (10.0 $in.^2$ per foot of tank diameter) and the width of any portion of any gap shall not exceed 3.81 cm (1½ in.).

(A) One end of the metallic shoe is to extend into the stored liquid and the other end is to extend a minimum vertical distance of 61 cm (24 in.) above the stored liquid surface.

(B) There are to be no holes, tears, or other openings in the shoe, seal fabric, or seal envelope.

(ii) The secondary seal is to meet the following requirements:

(A) The secondary seal is to be installed above the primary seal so that it completely covers the space between the roof edge and the tank wall except as provided in paragraph (b)(2)(iii) of this section.

(B) The accumulated area of gaps between the tank wall and the secondary seal shall not exceed 21.2 cm^2 per meter of tank diameter (1.0 $in.^2$ per foot of tank diameter) and the width of any portion of any gap shall not exceed 1.27 cm (½ in.).

(C) There are to be no holes, tears or other openings in the seal or seal fabric.

(iii) If a failure that is detected during inspections required in paragraph (b)(1) of § 60.113b cannot be repaired within 30 days and if the vessel cannot be emptied within 30 days, an extension of the 30-day repair or refill requirement of this sction may be requested from the

Administrator in the inspection report required in § 60.115b(b)(4). Such extension request must include a demonstration of unavailability of alternate storage capacity and a specification of a schedule that will assure that the control equipment will be repaired or the vessel will be emptied as soon as possible.

(5) Notify the Administrator 30 days in advance of any gap measurements required by paragraph (b)(1) of this section to afford the Administrator the opportunity to have an observer present.

(6) Visually inspect the external floating roof, the primary seal, secondary seal, and fittings each time the vessel is emptied and degassed.

(i) If the external floating roof has defects, the primary seal has holes, tears, or other openings in the seal or the seal fabric, or the secondary seal has holes, tears, or other openings in the seal or the seal fabric, the owner or operator shall repair the items as necessary so that none of the conditions specified in this paragraph exist before filling or refilling the storage vessel with VOL.

(ii) For all the inspections required by paragraph (b)(6) of this section, the owner or operator shall notify the Administrator in writing at least 30 days prior to the filling or refilling of each storage vessel to afford the Administrator the opportunity to inspect the storage vessel prior to refilling. If the inspection required by paragraph (b)(6) of this section is not planned and the owner or operator could not have known about the inspection 30 days in advance of refilling the tank, the owner or operator shall notify the Administrator at least 7 days prior to the refilling of the storage vessel. Notification shall be made by telephone followed by written documentation demonstrating why the inspection was unplanned. Alternatively, this notification, including the written documentation may be made in writing and sent by express mail.

(c) The owner or operator of each source that is equipped with a closed vent system and control device as required in § 60.112b(a)(3) or (b)(2) (other than a flare) shall meet the following requirements.

(1) Submit for approval by the Administrator as an attachment to the notification required by § 60.7(a)(1) or, if the facility is exempt from § 60.7(a)(1), as an attachment to the notification required by § 60.7(a)(2), an operating plan containing the information listed below.

(i) Documentation demonstrating that the control device will achieve the required control efficiency during maximum loading conditions. This documentation is to include a description of the gas stream which enters the control device, including flow and VOC content under varying liquid level conditions (dynamic and static) and manufacturer's design specifications for the control device. If the control device or the closed vent capture system receives vapors, gases or liquids, other than fuels, from sources that are not designated sources under this subpart, the efficiency demonstration is to include consideration of all vapors, gases, and liquids received by the closed vent capture system and control device. If an enclosed combustion device with a minimum residence time of 0.75 seconds and a minimum temperature of 816°C is used to meet the 95 percent requirement, documentation that those conditions will exist is sufficient to meet the requirements of this paragraph.

(ii) A description of the parameter or parameters to be monitored to ensure that the control device will be operated in conformance with its design and an explanation of the criteria used for selection of that parameter (or parameters).

(2) Operate the closed vent system and control device and monitor the parameters of the closed vent system and control device in accordance with the operating plan submitted to the Administrator in accordance with paragraph (c)(1) of this section, unless the plan was modified by the Administrator during the review process. In this case, the modified plan applies.

(d) The owner or operator of each source that is equipped with a closed vent system and a flare to meet the requirements in § 60.121(c), shall meet the following requirements:

(1) EPA reference Method 22 shall be used to determine the compliance of flares with the visible emission provisions of this subpart.

(2) The presence of a flare pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame.

(3) The net heating value of the gas being combusted in a flare shall be calculated using the following equation:

$$H_T = K\left(\sum_{i=1}^{n} C_i H_i\right)$$

where

H_T = Net heating value of the sample, MJ/scm; where the net enthalpy per mole of offgas is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°.

$$K = \text{Constant, } 1.740\times10^{7}\left(\frac{1}{\text{ppm}}\right)\left(\frac{\text{g mole}}{\text{scm}}\right)\left(\frac{\text{MJ}}{\text{kcal}}\right),$$

where

$$\text{standard temperature for } \left(\frac{\text{g mole}}{\text{scm}}\right) \text{ is } 20^\circ\text{C}.$$

C_i = Concentration of sample component i, as measured by EPA Reference Method 18.

H_i = Net heat of combustion of sample component i, kcal/g mole. The heats of combustion may be determined using ASTM D2382–76, if published values are not available or cannot be calculated.

(4) The actual exit velocity of a flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure), as determined by reference Method 2, 2A, 2C, or 2D, as appropriate, by the unobstructed (free) cross sectional area of the flare tip.

(5) The maximum permitted velocity, V_{max}, for air assisted flares shall be determined by the following equation:

$$V_{max} = 8.706 + 0.7084(H_T)$$

V_{max} = Maximum permitted velocity, m/sec.

8.706 = Constant.

0.7084 = Constant.

H_T = The net heating value is determined in paragraph (g)(4).

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.114b Equivalent equipment and procedures.

(a) Upon written application from any person, the Administrator may approve the use of equipment or procedures that have been demonstrated to the Administrator's satisfaction to be equivalent, in terms of reducing VOC emissions to the atmosphere, to those prescribed for compliance with § 60.112b of this subpart.

(b) Determination of equivalence to the specified equipment required in § 60.112b will be evaluated using the following information to be included in the written application to the Administrator:

(1) By an actual emissions test which uses a full-sized or scale-model storage vessel that accurately collects and measures all VOC emissions from a given control device and which accurately simulates wind and accounts for other emission variables such as temperature and barometric pressure.

(2) By an engineering evaluation which the Administrator determines is an accurate method of determining equivalence.

(c) The Administrator may condition the approval of equivalency on requirements that may be necessary to ensure operation and maintenance to achieve the same emissions reduction as specified in § 60.112b.

(d) The Administrator will publish a notice of preliminary determination in the **Federal Register** and provide the opportunity for public hearing. After notice and opportunity for public hearing, the Administrator will determine the equivalance of the alternative means of emission limitation and will publish the final determination in the **Federal Register.**

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.115b Reporting and recordkeeping requirements.

The owner or operator of each storage vessel as specified in § 60.112b(a) shall keep records and furnish reports as required by paragraphs (a), (b), or (c) of this section depending upon the control equipment installed to meet the requirements of § 60.112b. The owner or operator shall keep copies of all reports and records required by this section, except for the record required by paragraph (c)(1)(i), for at least 2 years. The record required by paragraph (c)(1)(i) will be kept for the life of the control equipment.

(a) After installing control equipment in accordance with § 60.112b(a)(1) (fixed roof and internal floating roof), meet the following requirements.

(1) Furnish the Administrator with a report that describes the control equipment, and certifies that the control equipment meets the specifications of § 60.112b(a)(1) and § 60.113b(a)(1). This report shall be an attachment to the notification required by § 60.7(a)(3).

(2) Keep a record of each inspection performed as required by § 60.113b (a)(1), (a)(2), and (a)(3). Each record shall identify the storage vessel on which the inspection was performed, and shall contain the date the vessel was inspected, and the observed condition of each component of the control equipment (seals, internal floating roof, and fittings).

(3) If during the annual visual inspection, required by § 60.113b(a)(2), any of the conditions described in § 60.113b(a)(2) are detected, a report shall be furnished to the Administrator. Each report shall identify the storage vessel, the nature of the defects, and the date the storage vessel was emptied or the nature of and date the repair was made.

(4) After each inspection required by § 60.113b(a)(3) that finds holes or tears in the seal or seal fabric, or defects in the internal floating roof, or other control equipment defects listed in § 60.113b(a)(B)(ii), a report shall be furnished to the Administrator. The report shall identify the storage vessel and the reason it did not meet the specifications of § 60.112b (a)(1) or § 60.113b(a)(3) and list each repair made.

(b) After installing control equipment in accordance with § 61.112b(a)(2) (external floating roof), meet the following requirements.

(1) Furnish the Administrator with a report that describes the control equipment and certifies that the control equipment meets the specifications of § 60.112b(a)(2) and § 60.113b (b)(2), (b)(3), and (b)(4). This report shall be an attachment to the notification required by § 60.7(a)(3).

(2) Within 60 days of performing the seal gap measurements required by § 60.113b(b)(1), furnish the Administrator with a report that contains:

(i) The date of measurement.

(ii) The raw data obtained in the measurement.

(iii) The calculations described in § 60.113b (b)(2) and (b)(3).

(3) Keep a record of each gap measurement performed as required by § 60.113b(b). Each record shall identify the storage vessel in which the measurement was performed and shall contain:

(i) The date of measurement.

(ii) The raw data obtained in the measurement.

(iii) The calculations described in § 60.113b (b)(2) and (b)(3).

(4) After each seal gap measurement that detects gaps exceeding the limitations specified by § 60.113(b)(4), submit a report to the Administrator. The report will identify the vessel and contain the information specified in paragraph (b)(2) of this section, and the date the vessel was emptied or the repairs made and date of repair.

(c) After installing control equipment in accordance with § 60.112b(a)(3) or (b)(1) (closed vent system and control device), meet the following requirements.

(1) The following records shall be kept.

(i) A copy of the operating plan.

(ii) A record of the measured values of the parameters monitored in accordance with § 60.113(c)(2).

(2) After installing a flare to comply with § 60.112b, a report containing the measurements required by § 60.113b(d)(1), (2), (3), (4), and (5) shall be furnished to the Administrator.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 60.116b Monitoring of operations.

(a) The owner or operator shall keep copies of all records required by this section, except for the record required by paragraph (b) of this section, for at least 2 years. The record required by paragraph (b) of this section, will be kept for the life of the source.

(b) The owner or operator of each storage vessel as specified in § 60.110b(a) shall keep readily accessible records showing the dimension of the storage vessel and an analysis showing the capacity of the storage vessel. Each storage vessel with a design capacity less than 75 m^3 is subject to no provision of this subpart other than those required by this paragraph.

(c) Except as provided in paragraph (f) of this section, the owner or operator of each storage vessel either with a design capacity greater than or equal to 151 m^3 storing a liquid with a maximum true vapor pressure greater than or equal to 1.75 kPa or with a design capacity greater than or equal to 75 m^3 but less that 151 m^3 storing a liquid with a maximum true vapor pressure greater than or equal to 15.0 kPa, shall maintain a record of the VOL stored, the period of storage, and the maximum true vapor pressure of that VOL during the respective storage period.

(d) Except as provided in paragraph (f) of this section, the owner or operator of each storage vessel either with a design capacity greater than or equal to 151 m^3 storing a liquid with a maximum true vapor pressure that is normally less than 3.5 kPa or with a design capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure that is normally less than 27.6 kPa, shall notify the Administrator when the maximum true vapor pressure of the liquid exceeds the respective maximum true vapor pressure values for each volume range.

(e) Available data on the storage temperature may be used to determine the maximum true vapor pressure as determined below.

(1) For vessels operated above or below ambient temperatures, the maximum true vapor pressure is calculated based upon the highest expected calendar-month average of the storage temperature. For vessels operated at ambient temperatures, the maximum true vapor pressure is calculated based upon the maximum local monthly average ambient temperature as reported by the National Weather Service.

(2) For crude oil or refined petroleum products the vapor pressure may be obtained by the following:

(i) Available data on the Reid vapor pressure and the maximum expected storage temperature of the stored product may be used to determine the maximum true vapor pressure from nomographs contained in API Bulletin 2517 (incorporated by reference—see § 60.17), unless the Administrator specifically requests that the liquid be sample, the actual storage temperature determined, and the Reid vapor pressure determined from the sample(s).

(ii) The true vapor pressure of each type of crude oil with a Reid vapor pressure less than 13.8 kPa (2.0 psia) or whose physical properties preclude determination by the recommended method is to be determined from available data and recorded if the estimated maximum true vapor pressure is greater than 1.75 kPa.

(3) For other liquids, the vapor pressure:

(i) May be obtained from standard reference texts, or

(ii) Determined by ASTM Method D2879–75 (incorporated by reference—see § 60.17); or

(iii) As measured by an appropriate method as approved by the Administrator; or

(iv) As calculated by an appropriate method as approved by the Administrator.

(f) The owner or operator of each vessel equipped with a closed vent system and control device meeting the specifications of § 60.112b is exempt from the requirements of paragraphs (c) and (d) of this section.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

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